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Editorial Notes

IT is the aim of these Notes to state that ' which oft was thought but ne'er so well expressed ', and to judge by the letters received our last Notes seem to some extent at least to have achieved their purpose. Several readers wrote expressing satisfaction, and only one to protest. The subject is important enough to justify further discussion.

We criticized the attitude of the British Government and Universities to archaeology and history (and also, parenthetically, to some other subjects outside our province). We deplored the narrow outlook of the average educated person, and cited as evidence the weekly culture-content of the *New Statesman and Nation*. We put the blame on an educational system which ignores or under-values vast tracts of knowledge, and makes little or no use of the work of those who are creating it.

What, in our own subject, are the major achievements of the last few decades ? How, and in what directions, have archaeologists enlarged the view of man and his past ? By their spade-work in the East they have discovered the origins of civilization, of urban life, and of many of the arts, including writing. (All this has been set down in language that all can understand by Professor Gordon Childe in his books, especially in *Man Makes Himself* and *What happened in History*). They have shown that civilizations rose and fell, and that religions which lasted longer than any modern ones and were accepted as true by millions of people vanished as completely as the societies which made them. They have unearthed (at Ras Shamra) an epic poem which throws a flood of light upon the early religions of Syria and Palestine, including Judaism and Christianity. They have rediscovered lost languages and found the clues by which to translate them. By spade-work alone they have reconstructed a picture of the society which produced the poems of Homer and the literature of the Old Testament. In Crete and India they have brought to light civilizations whose very existence had been forgotten, which lasted as long as ours or longer and then vanished. In our own island they have revealed more than 2000 years of prehistory, and made it possible to describe in some detail the four centuries of Roman occupation, about which history tells us almost nothing. The descriptions have been written by horny-handed archaeologists such as Haverfield, Macdonald, Collingwood, Wheeler and Richmond, in books and articles many of which are themselves masterpieces of literary style.

Many of these enlargements of world history have been made by British archaeologists, financed not by the Government or by the Universities but by private societies and individuals, and sometimes (as in Crete and Egypt) by the excavators themselves. British archaeologists have also been responsible for the chief technical advancements in excavation, and for such wholly new instruments of research as air-photography and the use of distribution-maps. The equally important techniques of tree-ring study (dendrochronology), pollen-analysis and clay-varves were invented by American, Danish and Swedish archaeologists respectively; and German, Swiss and Scandinavian archaeologists have long led the world in the art of museum exhibition. One of the chief refinements of excavation technique (the detection of post-holes) has been elaborated by a German archaeologist whose name will always be associated therewith, though he would not claim to have been the first to use it. Readers of ANTIQUITY have been kept regularly informed of all these advances.

It goes without saying that similar progress has been made in other branches of knowledge (such as, for instance, astronomy, biology, meteorology and geology) which, though beyond the scope of ANTIQUITY, should come well within the purview of a weekly journal that has a cultural section. We say ' cultural ' because it is the chief ground of our criticism that space which, in our opinion, should be given to culture generally, has become the stamping-ground of a literary clique. It is not literary people so called but those who are advancing the bounds of knowledge who are the creative artists of today. It is they who have something to tell the world that it did not know before, and they are doing so to the best of their ability. Some of them tell it in better English than many professional writers; but whether they tell it well or ill, their story is alive with the spirit of research, and they write with inward conviction. When therefore our protesting correspondent contrasts ' creative writers ' with ' scholars ' and objects to the ' anti-intellectual tone ' of our last Notes, we can afford to smile at his naïve ignorance. By what right can these literary gents claim the monopoly of creative writing? Are historians, then, not creative writers though they recreate the past instead of inventing it? Are not the works of the scholar-archaeologists we cited above as much entitled to be called ' creative ' as those of some third-rate novelist or minor poet? Is not the discovery of new knowledge and its synthesis in books creative work of the first order? Of course it is; but no echo of it all seems ever to reach Great Turnstile.

Let no one confuse the issue by accusing us of attacking good literature, which we enjoy as much as anyone else. To do so would be rediculous and rightly bring us into contempt. We are merely protesting against the narrow-mindedness of a literary clique, and their pretentious claim to a monopoly of culture. This attitude is an insular survival of pre-Darwinian Times, and is not found in other countries which have progressively integrated the elements of their culture. The cultural sections of papers published (for instance) in Switzerland are not exclusively, or even predominantly, ' literary ', but cover a wide range of knowledge. As an example of this narrow outlook we would cite an article published in the *New Statesman* soon after the war ended. The writer was reporting on a visit to Germany after years of bombing. But it did not occur to him to tell us what had happened to any of those once famous museums in which so

much of the world's culture was stored. He could so easily have found out what really happened to the treasures of the Berlin Museums, and especially to the Pergamon altar and the Ishtar gate (see ANTIQUITY VI, 1932, 60–70)—did they survive the bombing only to be carried off (with much else) as loot by the soldiers of the U.S.S.R., as we were told in Switzerland? But either he didn't think we should be interested in museums or (more probably) had never heard of them.

The real trouble with archaeologists, of course, is that they are of the earth, earthy, savouring of manual labour. Some are even said to do their own digging. In India one of them once broke every taboo and used a trowel, thus simultaneously letting down the side, the old school and the officer caste, and shocking an unknown number of caste-ridden Indians. Not for such are the Ivory Towers or meditations on the Meaning of Existence. They do not understand that culture can only exist in a vacuum, and that form comes before content. ('The most beautiful books are those with the least matter', wrote Flaubert, whose ideal was to write a book 'about nothing'). They believe in the unity of theory and practice and write about what they have done. Their views on the 'literary' racket are usually given in a few well chosen, but unprintable, words.

Though we may critize individuals and groups, they are after all the victims of a civilisation which is in its second childhood and has lost all faith in itself. But some of those who know most about human history have not lost faith in humanity. Their outlook is perforce a world outlook, oriented to the future, and inspired, consciously or unconsciously, by a belief in world unity. Just as national history formed the background of national culture, so will the history of mankind form the background of world culture. It will then no longer be necessary for anyone to live in Ivory Towers.

PERSONAL NOTE. Mr O. G. S. Crawford has retired from the Ordnance Survey, and has been succeeded as Archaeology Officer there by Mr C. W. Phillips. Mr Crawford asks that readers who have occasion to write about matters of topography should in future address their letters to his successor (Ordnance Survey Office, Chessington, Surrey) and not to him.

Early Khartoum*

by A. J. Arkell

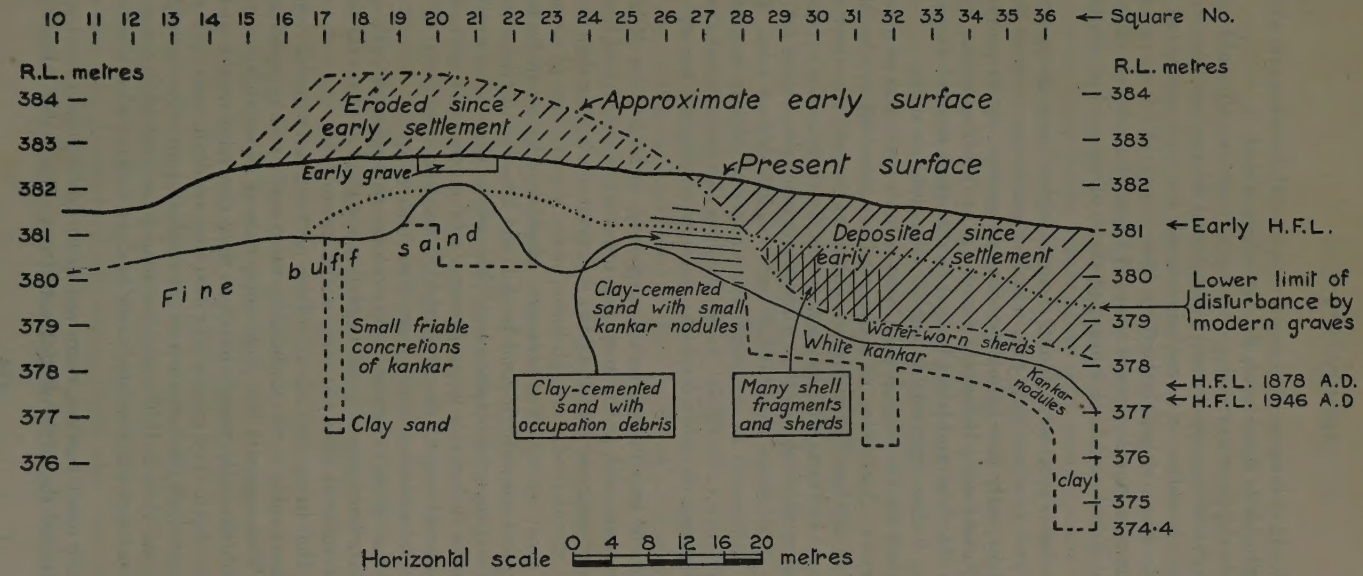
DURING the recent war the discovery of microlithic implements and potsherds decorated with incised wavy lines on a mound east of the Civil Hospital in Khartoum, which had been used as a cemetery during the siege of Khartoum, led in the winter of 1944–45 to the Sudan Government Antiquities Service undertaking its first excavation. For it was decided that the site should not be built on before it was excavated, and then it was thought that it was required for an immediate extension of the Hospital; and, as the war was not yet over, it was impossible to interest archaeologists from outside the Sudan in its excavation.

The site is the highest spot in Khartoum, the top of the mound being just over 382 m. Reduced Level. The graves dug during the siege, which frequently numbered as many as one per square metre, had much disturbed the evidence of earlier occupation. The mound was found to have been used as a burial place at various other times. Meroitic burials dating from about A.D. 50–150 were found, and two of them were sufficiently undisturbed for it to be established without doubt, as W. B. Emery had suggested at Ballana and Qustul, that certain tapered stone rings which are found in the Sudan, were not, as was first thought, staff heads, but a form of archer's loose, as is still used in Mongolia to enable the archer to draw a stronger bow than he can draw by merely using his thumb and forefinger. In both graves the stone rings were in position on the right thumb, and iron arrowheads were also found.

The diagram (page 173) shows the section of one of the trenches cut through the mound from north to south. The broken line at the bottom shows the lower limit of excavation, where that does not coincide with a line drawn to indicate any natural feature. The present surface, the approximate early surface, and the limit of disturbance due to recent graves are also shown. Occupation debris such as sherds and stone artefacts were plentiful within the area disturbed by recent graves, and had found their way down animal burrows below it, particularly south of square 22. North of this square the buff sand under the layer containing occupation debris was cemented by silt introduced by the river, and so was much harder to dig, with the result that the holes of burrowing animals did not normally occur below the soil disturbed by grave-digging.

In squares 25–28 occurred a marked fall in level of this silt-cemented sand, which is interpreted as being due to its having been the bank of the high Blue Nile at the time of the early settlement. In these squares above the undisturbed soil was found a compact mass of *Ampullaria* shell fragments, sherds, fragments of sandstone rubbers and some artefacts. In square 28 this debris was undoubtedly *in situ*, as thrown on the river bank. No evidence of human burial or habitation was found north of square 26; and from square 29 northwards bone fragments became rare and soon disappeared, while sherds were waterworn. The layer of waterworn sherds was still continuing in square 36, gradually falling in level, when digging in that direction had to be abandoned owing to the labour involved by the depth which had been reached—three metres below present

* A preliminary account of the excavation carried out by the Sudan Government Antiquities Service in 1944–5; and based on the Presidential Address given to the Philosophical Society of the Sudan on April 29, 1947.



EARLY KHARTOUM. N-S SECTION → N

surface in very hard soil. It is interesting to note that here the waterworn sherds were still just above the 1878 Blue Nile flood level, the highest recorded.

In the buff sand below the layer containing occupation debris small friable calcareous concretions began to occur about square 17, and precipitated calcium carbonate or kankar became progressively more in evidence towards the north in what must have been the bank and flood plain of the river, although the form changed rapidly from one square to another. In the silt-cemented sand in square 22 small kankar nodules visible to the eye were plentiful and evenly distributed. In square 31 there was a marked white band of it at 378.75 m. R.L.

Small calcreted nodules of sand were found in undisturbed sand as high as 382 m. R.L. in squares 19–21 ; and at about 382.5 m. R.L. in squares 20–21 were found the least disturbed early burials, only just below the present surface of the ground. The bones of these human burials were definitely fossilized by the deposition of kankar, while the bones of people (Meroitic and later) buried in the same mound at 381 m. R.L. during the last 2000 years had no appreciable kankar deposited on them.

The distribution of this kankar is such that it must have been due to precipitation at or above the upper limit of fluctuation of a water-table controlled by the Blue Nile, the precipitation occurring during the rainless months and when the river was low. The calcretion of the human bones and occupation debris above 382 m. R.L. is an indication of a raised water table which depended primarily on the river level (at the high flood stage) irrespective of whether the rainfall was considerable or not. By about A.D. 100 the water table had ceased to reach 381 m. R.L. The highest recorded flood since 1874 reached 377.57 m. R.L. in 1878. It seems therefore established that during the time of the early settlement the Blue Nile was at least four metres higher than it is at present high flood level.

Further the discovery of two fragments of sandstone, to which the Nile Oyster, *Aetheria elliptica*, had been attached, in the area seen to have been the river bank at the time of the early settlement, suggests that the river was not only higher than at present, but that it may have been maintained at a high level for the greater part of the year, and not high only for a very short period as at present. *Aetheria elliptica* shells have been noticed unfossilized many feet above high flood level in the Khashm el Girba area of the Atbara river and in the Dongola reach of the main Nile, where they tell a similar story. (Another possible alternative is that this was a summer site on the bank of the low Nile, and in that case the difference between the present high flood level and that at the time of the early settlement must have been much more than four metres).

It will be seen below that there is indeed some evidence to suggest that, though there was a dry season in the year, the average annual rainfall at the time of the early settlement was at least 500 mm. as compared with 164 mm. at the present day.

It should be noticed that in squares 20–21, where parts of early burials were found *in situ* just below the present surface, the undisturbed fine buff sand approaches nearest to the present surface. This suggests the probability that at about this point was the top of a sandhill, on which the early people lived, as they naturally would, at the edge of the river ; and since the bottom of graves dug into that sandhill were approximately at 382.5 m. R.L., we may conclude, that the top of the sandhill probably reached at least 384 m. R.L. Since that time the sandhill has been almost entirely eroded away, while considerable deposition has taken place immediately to the north on what used to be the flood plain of the river.

Since there had been so much erosion, there was little stratification or soil remaining undisturbed since the time of the early settlement, from which the relative ages of

objects found could be deduced. A mound in an important geographical situation near the junction of the two Niles, that has been for about 125 years inside the capital city of the Sudan, could not escape quarrying, habitation, or use as a burial ground at various periods, and any large objects left by early inhabitants will probably have been removed or damaged by subsequent visitors, who will also have left their own remains behind to confuse the issue. And indeed nothing but a mass of fragmentary remains was found, some of which, such as sherds from pots buried in the Meroitic graves already mentioned, it was not difficult to distinguish ; although there were other objects as to which it is difficult to decide whether they were contemporary with the early settlement or not. Fragments of incised bone hairpins that may date to *c.* 3000 B.C. may be mentioned in passing, some potsherds to be discussed below which may be of the same date, a few sherds that appear to be Pan-grave (*c.* 2000 B.C.), and the top of a wheel-made pot that is probably Napatan (*c.* 600 B.C.) ; and there were a few extended burials with no grave goods that ante-dated the siege of Khartoum and may date from the time of the Christian Kingdom of Soba. At first, however, only those objects will be considered which from their calcreted condition almost certainly date from the early settlement, when the water table reached 382.5 m. R.L.

Traces of seventeen early burials were found all more or less disturbed, but in which at least two or three of the bones remained still in position as they had been buried. Many other fragments of fossilized human bones were found that no doubt came from these and other early burials. The bodies were buried with care in a flexed position without any particular attention to orientation. The bones were broken into many fragments, and had in many cases been so broken before the deposition of kankar ceased. One striking find was the crushed skull and upper part of the body of a young woman, with facing her the facial portion of the skull of a child, which had been left as a little island between three graves that dated from the siege of Khartoum. The only goods found in any early grave were a string of ostrich egg-shell beads with one burial and a fragment of a large pot, which had been placed as a pillow under the skull, in another.

All the human remains found were sent to Dr D. E. Derry in Cairo. He put one of the skulls together as far as warping of the bone fragments would allow. The head is long and narrow ; and the face is long although its length is masked by its great width. The nose is flat and wide. The upper central incisors had been removed in all the skulls found. The teeth show the parallel arrangement frequently associated with prognathism in negro crania. The mandible is massive and the ramus wide and low, another negro feature. The mandibular angle is also negroid. On the other hand the depth of the symphysis and the relative prominence of the chin are the reverse. Eversion of the angle of the ramus gives the face a quadrangular appearance. Dr Derry concluded that the bones were those of a definitely negroid race of heavily built people, and in the only individual of which he was able to calculate it, the height was about six feet.

A few fragments of human bone that had been gnawed by some animal before fossilization suggest that the site may only have been inhabited seasonally. The only evidence of habitation was a number of fragments of burnt clay from wattle and daub constructions, some of which showed impressions of a fibre rope, which was used double and passed on either side of the reeds it secured in a kind of plait. The stalks are not those of a cultivated millet; for they are too thin and there is an absence of jointing. It is probable that only windscreens, as used by Dinka and Nuer today in similar situations, were used, and that the clay daub has only survived from where it was baked by fires lit in the lee of the windscreens. These together with the strew of sherds, stone artifacts,

bone and shell fragments are sufficient to show that the people lived on the mound, as well as burying their dead in it.

No doubt as well as making rope, they made basket-work and used wooden implements, but none of these survived nor any evidence of clothing. That they were not indifferent as to their appearance is indicated by the ostrich egg-shell disc beads, a few pendants of bone and teeth associated with these beads, a (?) necklace made from the vertebrae of a python, from which the processes had been removed by rubbing, and many lumps of red and yellow ochre, with which they no doubt decorated their bodies, as Nuba and other tribes still do today in the Sudan. (Several of the sandstone grinders were still stained with this ochre).

In their tools they were still in the Stone Age, but approaching the end of that age. Their best tools were microlithic, made from quartz pebbles from the Nubian Sandstone easily obtained on the west bank of the Nile, while for hammer-stones, fabricators for backed blades, and material for larger flake tools they went 50–60 miles to the region of the Sixth Cataract for gneiss pebbles and rhyolite. The microliths include backed blades no doubt used for working wood and bone, lunates for the same purpose and for fitting to arrow-shafts as barbs, borers for riveting pots and also for use with wood and bone, and perhaps trapezes, of which a limited number were found and which formed the chisel arrow-heads favoured in Egypt in predynastic and dynastic times for hunting. The larger stone tools were made with less care and hardly conform to any type, but they include flakes struck from prepared cores, scrapers made on the backs of flakes, rare hollow scrapers, and some well made backed blades, which were no doubt used in making the fine barbed bone spear-heads and arrow-heads shortly to be described.

Sandstone rubbers or upper grindstones of various shapes were numerous, and they may all have been used for grinding ochre. Another probable use is for grinding clay for pottery, for the clay in the potsherds is well levigated. A few small lower grindstones were found, but only fragments of those which could have been as large as the saddle querns still used for grinding grain in the central Sudan today, and these fragments were much less numerous than the many rubbers or upper grindstones. They do not appear to have been either of the shape or of the specially hard sandstone used today for grinding grain ; and there is no reason to think that the early inhabitants of Khartoum cultivated or even ground grass seed for food ; although negative evidence is always to be distrusted, and in the 19th century the site would no doubt have been pillaged for any grindstones that could have been used for grinding grain.

Some of the sandstone rubbers may have been used like sandpaper for shaping wood or bone ; others had been perforated with an hour-glass perforation from pits worked from opposite sides of their flat surfaces. No complete specimens were found but many fragments, so many of which were unfinished that it looks as if the double pitting had some functional purpose of its own. But when the stone wore through, it was sometimes made into a stone ring ; and judging from the diameter of the perforation in some of these finished but fragmentary rings, they were probably used as stone heads for clubs ; while a few others have a perforation large enough for them to have been used as bracelets.

A number of rounded pieces of sandstone from two to three inches long have a grooved waist, and are similar to fishing line sinkers used in out of the way places in Ireland today. Rougher pieces of sandstone with grooves round them are still used for the same purpose in the Sudan ; and though no certain fish-hooks were found, the early people could make lines and may have used natural bone fragments as gorges, if certain objects in bone and stone were not primitive fish-hooks.

It was a surprise to discover that the people of early Khartoum were clever workers in bone, and made multi-barbed bone spear-heads comparable to those of the Upper Palaeolithic in Europe. Unfortunately only fragments of these spear-heads were found, preserved among other occupation debris by the deposit of kankar formed on them. In all some 270 fragments were collected, many of them only small pieces. Most of them were broken before they were coated with kankar, indicating that they were broken at the time the site was occupied, probably in the chase when the fish or other game was stabbed. Fragments with points or barbs must have been brought back to the settlement embedded in the body of the game, and discarded on the site with other bone fragments when the catch was eaten. Butt fragments were no doubt discarded when a new bone spear-head was fitted to the shaft brought back home from the chase for repair.

Three fragments indicate that spears with at least four barbs existed. The points show considerable variety. The butt fragments have grooves round them obviously made to secure the cord with which this end of the spear-head was bound into the shaft. One example, more crudely made than usual, is almost complete and has only two barbs. Three fragments show that spearheads with barbs on either side of the shaft were occasionally made. Five fragments of barbed bone spear-heads were bored through at the base of a barb and so were probably intended for use as harpoons. Fragments of points, barbs and butts were also found which came from weapons too small to have made practical spear-heads, and there can be very little doubt that they are fragments of barbed bone arrow-heads (see PLATE I).

One fragment of bone spearhead shows that the shaft had been polished and decorated with incised crossing lines ; and when it has been possible to clean the kankar incrustation from all specimens, it will probably be found that other spearheads were similarly decorated.

Half a small rectangular pendant of bone, about 62 mm. long by about 36 mm. wide when complete, was decorated with a border of incised slanting lines along the edges of the slightly convex side.

Twelve examples of the distal end of the radius bone of a small ungulate such as an oribi had been rubbed down to a greater or less degree on either side of the natural groove which occurs between the two articulatory surfaces at the end of the bone.

Typical pots must have been large bowls of red-brown ware containing some angular quartz sand grains. These bowls had a simple rim slightly thinner than the rest of the pot. They were not burnished. They were smooth on the inside, and artificially roughened on the outside by a comb with several teeth. This combed decoration was carefully done near the rim in pleasing patterns of wavy lines, and more and more carelessly done as the base of the bowl was approached. This is deduced from the study of very many sherds, for no complete pot was found. The largest fragment found had been placed as a pillow under the skull in a burial, and was reconstructed from ten small pieces.

Many of the combs that were used by the early potters were found. They are made from the defence spines of the cat fish *Synodontis schal.* The spine was broken twice—not an easy thing to do—and the smaller teeth were rubbed off the back of the spine so as not to injure the hand of the potter.

Study of the sherds makes it appear probable that three other varieties of decoration for the outside of pots were made by the early potters with these cat-fish spine combs, viz :—lines of dots, broken lines, and irregular scoops ; and four further varieties were made by using complete cat-fish spines, in most of which the general principle was to

apply the spine serrated edge downwards into the clay and to move it gradually to one side by lifting first one end of the spine and then pressing it into the clay again before lifting the alternate end of the spine, and then repeating the process indefinitely. In all these cases the aim must have been to produce a bowl which looked like a basket.

A more sophisticated development of the original ' wavy line ' pattern, and a later one judging from the fact that on some other sites it is found without the plain wavy-line pattern, is one in which the pot has been first combed with wavy lines and then dots have been impressed along the grooved lines so formed.

Several other types of sherd were found which may or may not be contemporary with the early settlement, but only those which may well be contemporary are mentioned here. In one a coarse clay bowl was decorated to look like a basket with impressions made from a thin cord twisted round a stick ; in the other a fairly thin red brown ware was decorated with lines of fairly widely spaced dots made with a sharp point.

The food of the early inhabitants is indicated by the many fishbones and fragments of mammal bones, all of which had been broken, presumably for the extraction of the marrow. A selection of bones, teeth and horn cores were sent to Dr Derry, who identified crocodile, porcupine, hippopotamus, wart-hog and buffalo. He reported that none of the horn cores were those of cattle and that three belonged to the same type of animal with backwardly directed horns, which might be those of a waterbuck. He concluded : ' The question whether these people kept domestic animals is difficult. The presence of the animals definitely identified would seem to support the suggestion that these people were hunters and fishermen rather than shepherds. The heterogeneous nature of the collection of bones bears this out '.

In order to clear up if possible the question whether any domesticated animals were present, all the bone fragments we found have been sent to the British Museum (Natural History), and so far the preliminary examination by Miss D. M. A. Bate has added elephant, rhinoceros and reed rat to Dr Derry's list, but has not revealed any domesticated animals.

It is thus probable that the people were hunters and gatherers. No doubt their women collected various wild fruits and perhaps seeds, but the only vegetable item of their diet of which any trace was found were the seeds of the *Celtis integrifolia*, of which the soft fruit is still eaten in parts of the Sudan.

In addition to the cat fish *Synodontis schal*, the bones of the fishes *Clarias anguillaris*, *Bagrus bayād*, *Tilapia nilotica* and *Lates niloticus* have been identified, some of the last named having come from very large specimens. As well as the crocodile and *Varanus* lizard, the river turtle (*Trionyx* sp.) and the python were apparently eaten, the latter being the only snake eaten by Nilotes today.

The many fragments of the shell of the large operculate river snail *Ampullaria wernei* were at first thought to indicate that in hard times this snail formed an important article of diet, but I am informed that while the Shilluk never eat *Ampullaria* their fishing camps are strewn with fragments of its shell, for the snail is a favourite bait for fish. The number of whole shells of *Ampullaria*, both mature and immature, found on the site suggest that possibly at high river this snail also lived on the mound. It is an air-breathing snail which lives in shallow swamps, and if this is so, it indicates a very different countryside at Khartoum to the present, as indeed is suggested by the fauna so far identified.

Many of the shells of the large land snail *Limicolaria flammata* Caill. were also found on the mound, where they had certainly been living, as had also quantities of the small land snail *Zootecus insularis* Ehrn. *Limicolaria* today requires an average annual rainfall of at least 450 mm., and flourishes where the annual rainfall is about 600 mm. *Celtis*

integrifolia also requires an annual rainfall of at least 450 mm., and the nearest living examples of this tree and of *Limicolaria* are today to be found in the Sennar area, where also incidentally are the nearest living elephants. So that it looks as if at the time of the early settlement the average annual rainfall at Khartoum was probably about three times the present (164 mm.).

Further evidence of different vegetation in the Khartoum area at the time of the early settlement, and therefore of a probably wetter climate, is provided by the identification by Miss Bate of three fossil fragments from the site as belonging to an extinct reed rat, which she has described as *Thryonomys arkelli*, and which is related to another extinct reed rat, *Thryonomys logani* from near Guir in the southern Sahara. The nearest living relations of this group of reed rats are now found south of the Equator, the reed rats found in the Lake Chad area and the southern Sudan belonging to another group.

An attempt will now be made to give a picture of what this excavation has revealed. It indicates a comparatively small community of negroid people, more massively built than the modern Nilotes, the Shilluk, Dinka and Nuer, but living such a life as the Nilotes live today and in similar surroundings, camping on a sandhill at the edge of the river with wattle and daub shelters that may not have been more than windscreens. Indeed the following description by Evans-Pritchard of the life of the Nuer indicates the sort of life the early people of Khartoum used to live, with the added complications of agriculture and cattle-keeping substituted for hunting as the main means of livelihood :

> ' Nuer are forced into villages for protection against floods and mosquitoes and to engage in horticulture, and are forced out of the villages into camps by drought and barrenness of vegetation to engage in fishing . . . A Nuer homestead consists of cattle byres and huts . . . Both byres and huts are of wattle and daub . . . In dry season camps men live in windscreens and women in beehive huts, or both sexes in beehive huts. These flimsy shelters are erected a few yards from water . . . with their backs to the wind, and are simply constructed, the roots of grasses . . . being tightly packed in a narrow trench to make windscreens, and the tops of the grasses being bound together and plastered with dung on the outside to make huts '. (*The Nuer*, pp. 63–6).

There is however no evidence that the people of early Khartoum had domesticated animals or cultivated. They hunted a variety of wild animals including elephant, rhinoceros, hippopotamus, buffalo, antelope and gazelle with spears and bows, and they no doubt used traps as well. They also caught fish, perhaps most often by spearing them, but they also caught them on lines. They supplemented their diet with wild fruits such as that of the *Celtis* tree.

They decorated their bodies with red and yellow ochre, and some of them had necklaces of ostrich eggshell disc beads or adorned themselves with strings of python vertebrae. The ostrich egg shell beads do not seem to have been made in the settlement and were probably obtained by barter from elsewhere.

They made large bowls of well-made red-brown pottery with simple rims pleasingly decorated with wavy line combing in imitation of baskets, and since they used twine and reeds for wattle and daub constructions, there is little doubt that they made mats as well as baskets, although none have survived.

Their tools were of stone, some of which they fetched from the Sixth Cataract ; and they were exceptionally skilful makers of bone spear- and arrow-heads.

They buried their dead carefully in a flexed position in the mound on which they lived, but it seems probable that they did not live on this mound all through the year.

The Date of the Early Settlement

And now to try to decide how old are these remains of early Khartoum. The Meroitic graves are dated to between A.D. 50 and 150 with some confidence on the archer's looses and beads. The early settlement was clearly long before that, for in the meanwhile the water table controlled by the Blue Nile had fallen away from what is the very top of the mound today. It must have been a very long time ago, if the conclusions are sound that the Blue Nile in the time of the early settlement was at least four metres higher at high river than it has been during the last seventy years ; that the climate was so different that the Nile remained high for the greater part of the year, and there was a local annual rainfall of at least 500 mm. ; while the fauna and flora were like what exists today between Sennar and Singa or further south, with elephant, rhinoceros, buffalo and antelope (the Nile Lechwe, White-eared Cob, etc.) common in the vicinity ; and that domesticated animals had perhaps not yet reached this part of the Nile Valley. It is impossible to say exactly yet, but for the following reasons it is suggested that it was probably before 4000 B.C.

About 950 sherds were found on the site which are known to belong to one culture, for during the last war two graves were found near Omdurman Bridge containing 15 pots or more each, of the same wares as these 950 sherds. One of these wares is decorated by being combed externally and then burnished with a pebble so as not to remove all traces of the combing but to produce a rippled effect.

In an unstratified site it is impossible to be certain, but it appeared from the distribution of these sherds, which was irregular, suggesting that they came from one or two disturbed graves, and from their condition—none being as heavily coated with kankar as were some of the sherds confidently associated with the early settlement—that these rippled sherds of the Omdurman Bridge Culture were later than the early settlement.

This rippled ware has its closest known counterpart in the rippled A Group ware found by the late Prof. F. Ll. Griffith at Faras north of Wadi Halfa ; and one of the pots from Faras now in the Khartoum Museum is identical (except in size) in every particular (shape, rippling, red outside—black inside, and decorated rim) with one of the pots from Omdurman Bridge. By objects imported from Egypt found with them the Faras pots were dated to Sequence Date 77–81 corresponding with the rise and expansion of the First Dynasty, or perhaps a century before 3000 B.C. Of course there may have been a time lag, but the Omdurman and Faras pots are so similar that there seems to be no reason for thinking that they are not contemporary.

Several other eroded early occupation sites in the Khartoum area have been studied, and while until further excavation is done it is impossible to be certain, it appears that in between the culture represented by the early Khartoum settlement and which at present from its typical pottery I am calling the Wavy Line Culture there comes another culture with its own characteristic hard red pottery decorated with regular schematic incised patterns. This culture includes stone implements, of which the most striking is the gouge, which hitherto have only been found in Egypt in the Fayum associated with the culture called Fayum Neolithic B by Miss Caton-Thompson. Apparently associated with what it is suggested shall at present be called the Gouge Culture in the Khartoum area are sherds of small saucers decorated inside and out with impressed patterns, such as were found at Hu-Dendereh in Egypt and are of predynastic date, being given Sequence Date 33 by Petrie in *Diospolis Parva*, pl. XIV 55, and the *Prehistoric Egypt Corpus*, n. 55. Sequence Date 33 is early in the predynastic and is probably not later than 4000 B.C.

A date for ' Early Khartoum ' earlier than the Egyptian predynastic is apparently indicated by the barbed bone spearheads, for while these occur in the Egyptian predynastic period they have never more than three barbs, and the barbs get progressively less until there is only one. In the Fayum Neolithic the bone spearheads had as many as five barbs, but they were not as well made as those from Khartoum.

Wavy Line sherds have been found in the Sudan as far west as the Wadi Howar area, as far east as Kassala, and as far north as the Wadi el Gaab west of Dongola. The closest parallel to the Khartoum bone spears comes from Taferjit and Tamaya Mellet in the Sahara Nigérien far to the west. Pottery was also found there, but enquiry has so far not elicited the type. If the estimate of its early date is justified, we seem to have in ' Early Khartoum ' a people in a more or less mesolithic stage of culture between the Old Stone Age and the so-called New Stone Age with its beginnings of civilization, of the characteristic traits of which they seem to have had neither domestication of animals nor agriculture, but only pottery. At that time the climate was such that the southern Sahara was no barrier to communications, and it looks as if there may have been a common culture right across north Africa, which had pottery well made in the imitation of baskets to contribute to the civilization that was to arise in the Near East. It looks as if the Badarian culture of Egypt with its combed and rippled pottery, at present dated to about 4500 B.C., was an intermediate step in that direction. The stone implements of ' Early Khartoum ' have characteristics common to the Capsian of north Africa and the Wilton of East and South Africa. Thus the excavation of this unpromising site may metaphorically speaking have broken new ground and be pointing the way to the discovery of one of the component strands of the predynastic civilization of Egypt, and to the more accurate dating of some of the finds of archaeologists in Africa south and west of the Sudan. In any case it has thrown new light on the beginnings of civilization in the Sudan.

Subscriptions for 1948

The present number of ANTIQUITY completes the 22nd Volume, and the Editors wish to express their thanks for the support given during the year—support which encourages them to continue publication.

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ROLAND AUSTIN
24 PARKEND ROAD, GLOUCESTER

Egyptian and Medieval Pigeon-houses

by James Hornell

PIGEON rearing has been for centuries an industry of importance in Egypt, valuable alike for the tender morsels of flesh when the birds are cooked and for the manurial value of the guano which is a precious by-product of the business.

Travelling up the Nile Valley by rail the many pigeon-houses to be seen in the villages and on the outskirts of the towns passed *en route*, are generally the most arresting buildings noticed on the journey, interesting because of their evident importance in the economy of the land, as well as for the variety of design seen in the fortresslike buildings themselves, which change markedly in appearance as the traveller passes from the delta southwards to the Thebaid.

In the northern fashion, typical of the pigeon-houses of the Fayûm region, the roof of the massively built basal portion of the building is generally surmounted by a forest of little cupolas grouped in circles around a larger dome ; the sight of these numerous cupolas suggests instinctively the idea that the architectural design has been inspired by familiarity with the domed porticoes and appurtenances of the mosque whereto the architect was accustomed to repair when in a devotional mood.

Local variations, sometimes of distinctive design, are occasionally seen ; one of the most important is marked by the replacement of the cupolas by tall and narrow cones, of sugarloaf shape.

Farther south, when we reach the temple-strewn land of ancient Thebes, the pigeon-houses become more massive, the cupolas disappear and the structures more imposing architecturally, strong in the simplicity of their design. The observer feels that here, in this holy land, the architects founded their designs upon the pylons flanking the lofty gateways which formed the main entrances to the temples of old—grandly massive buildings, rectangularly oblong in plan, with the tall walls inclining slightly inwards in a characteristic gentle batter.

In all of these distinctive designs, the massive walls are nothing but an empty shell, wanting both in dividing floors and in vertical partitions. In the sun-dried bricks of the enclosing walls a number of apertures are contrived to enable the home-coming birds to enter within their home-tower, in order to reach their nests. Some of these entrances are circular, made by embedding empty pots in the walls or in the cupola vaulting when present, the bottoms being knocked out before they are fixed into position. Other and larger openings of a rectangular shape are sometimes provided, each furnished with a hinged flap-door which may be closed when necessary by means of a cord attached to a button or nailhead affixed to the outer surface—a kind of rectangular port-cover.

Within this shell of a building, many round-bellied pots are fitted, lying upon their sides, among the dried mud bricks whereof the walls are built, an arrangement recalling the parallel arrangement of cylindrical drain-pipes, stacked in horizontal layers, to form the typical construction of the beehives commonly seen in the Levant and particularly characteristic of those in use in Cyprus and Egypt.

So numerous are the nesting pots that the walls appear to be honeycombed from floor to roof ; each pot affords a comfortable nest to one pair of pigeons.

In the fortress-like pigeon-houses of Upper Egypt, it is usual to embed the butts of many long and leafless tree-branches arranged in horizontal rows at two levels in the upper sections of the building in order to provide perches for the cloud of pigeons when they are resting from their foraging raids upon the crops of the neighbouring farmers (PLATE II).

At a lower level, about half-way between the lower row of the perch-branches and the ground level, which is at from 20 to 25 feet below the perches, the proximal ends of a horizontal row of stout beams are let into the walls in such a manner that the beams project horizontally outwards to a distance of about four feet. Upon these beam ends, palm-leaf mats are laid and tied down, the object being to collect thereon all the droppings of the birds as they laze on their outdoor perches, digesting the fruits of their raids.

Periodically the droppings which accumulate on the mats are collected to serve as a highly valuable manure for fruit trees and certain vegetables. The fellahin attach great importance to this manure for other material for this purpose is exceedingly scarce owing to the prevalent custom of using the dried dung of cattle as fuel. It is true that a kind of earth called *sabakh*, mined from the mounds which have accumulated through many centuries on occupation sites where many generations of men have lived and worked, has considerable manurial value due to the high percentage of salts present, composed mainly of the useful potassium nitrate. This source, as is to be expected, is a diminishing asset and is likely to fail from exhaustion before long. For the higher priced vegetables, growers would therefore be in great difficulty could they not obtain pigeon manure in fair quantity and at a reasonable price. This product is, indeed, recognized as particularly suitable for the satisfactory growth of melons, the fruit most highly esteemed in hot countries for the welcome coolness of its succulent flesh.

Egyptians are not alone in dependence upon pigeon manure as the best fertilizer of ground devoted to melon cultivation. In Persia, in the environs of certain cities. Morier in his *Second Journey through Persia*, p. 140, is quoted by M'Clintock and Strong (1) for the statement that in Persia there are ' many pigeon-houses in the environs of certain cities at a distance from habitations, for the sole purpose of collecting pigeons' dung for manure. They are long, round towers, rather broader at the bottom than the top and crowned by conical spiracles through which the pigeons descend. Their interior resembles a honeycomb pierced with a thousand holes, each of which forms a snug retreat for a nest . . . The extraordinary flights of pigeons which I have seen alight upon one of these buildings afford perhaps a good illustration of that passage in Isaiah, LX, 8 '. [' Who are they that fly as a cloud and as the doves to their windows '].

Another traveller who notes the same extensive use of pigeon manure is Southgate (2) who saw the meadow ground lying between the town of Diarbekir and the river Tigris, ' watered and tilled with the greatest care and fertilized with the richest manure '. The soil so enriched ' supplies a variety of excellent fruits, among which melons are particularly celebrated. The land on which they are cultivated is enriched with pigeons' dung, for which purpose immense numbers of pigeons are kept in a village not far from the city. The delicious melons of Persia are raised in the same manner '.

The Egyptian owners of pigeon-houses periodically collect the accumulation of dung deposited upon the matting spread beneath the pigeons' perching places. They either sell what they do not require for their own land to merchants who load river boats with this cargo, or else they ship the surplus on their own account to likely markets

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[1] *Biblical Cyclopaedia*, II, p. 878–9.

[2] *Narrative of a tour through Armenia, Kurdistan, Persia and Mesopotamia in* 1840, 2 vols., 1840.

down stream. Luxor is a favourite market; on the river bank there, I have often seen boats discharging this strange cargo to buyers who cultivate the river flats and sand-banks left exposed as the water level recedes when the annual inundation begins to subside after depositing a fresh layer of rich top-soil upon the exhausted ground.

BRITAIN. Although pigeon rearing was practised by the Romans from a very early date as attested by many references in the classics, particularly those mentioned by Pliny, Varro and Columella, the industry does not seem to have been of importance in Britain until the time of the Crusades when returning pilgrims and crusaders brought back many useful notions picked up during their journeys through the lands of the Levant. This was one of the two most important factors leading to the establishment of pigeon-houses or *columbaria* in Britain and Western Europe. The other principal contributory factor was the rise of the feudal system which conferred discriminatory privileges upon persons of local power and influence. The manorial seigneurs and the clergy were those who benefited directly as being respectively the most influential of the lay and the clerical powers under the feudal institutions which began to spring up subsequent to the Norman Conquest. Foremost among the privileges which these twin dominants arrogated to themselves was that of being the sole classes entitled to build great pigeon-houses wherein the feathered serfs of these favoured persons might live, board free, at the expense of industrious crop-raising tenant neighbours.

It has been calculated that a pair of pigeons consume annually four bushels of corn, so if the number should amount to two thousand pairs, the annual levy of grain upon the neighbouring crops would amount to some 8,000 bushels or rather more than 200 tons! Need it be wondered that the farmers of the neighbourhood who received no recompense for this robbery of their crops, looked with angry resentment and envy upon this particular feudal right!

In Persia this burdensome levy had a religious basis. Muhammadans might build great pigeon-houses accommodating thousands of these pigeon harvesters but it was a privilege denied to Christians. Hence was created a strong temptation for Christians to become Moslem proselytes. According to the French travelling jeweller Tavernier, who has left a vivid record of his observations gleaned in the 17th century in Syria, Persia and India, so lucrative was the pigeon industry esteemed that 'some of the vulgar sort will turn Muhammadan to have that liberty (3)'.

The profits were twofold; the droppings of the birds supplied a substantial quantity of rich manure at practically no cost to the owners of the birds and this was readily saleable at a very remunerative price, whilst both the adult birds and the fledgelings or 'squabs' furnished a welcome addition of animal food of a people who, in Egypt, had few opportunities of including the flesh of cattle in their dietary, partly because of the prevalence of abject poverty or because of the lack of adequate pasturage. What cattle there are, are of too great milk value to permit them to be slaughtered as food except on very rare occasions or when ailing or too old to yield milk any longer.

In Britain, the development of the feudal system under the Normans and the limitation of the privilege of pigeon keeping to the territorial seigneurs, the rectors and the monastic orders, resulted in the erection of a great number of large dovecots throughout the country. A considerable number remain, usually in a sad condition of disrepair. Most commonly they are (or were) circular towers after the style then prevalent in France, but numerous exceptions are to be found, some being rectangular or hexagonal and occasionally even octagonal. One of the largest, that of the Priory of St.

[3] *Les six Voyages de J. B. Tavernier . . . en Turquie, en Perse et aux Indes*. Amsterdam, 1678.

Pancras at Lewes in Sussex, was an imposing, church-like building, cruciform in plan, and measured 92 feet from east to west ; it is reputed to have furnished accommodation to 4,000 pairs of pigeons, a number sufficient to supply the refectory table of the monks with unlimited quantities of pigeon pies during those winter months when only salted meat was available, a consequence of the necessity to kill all excess of cattle and sheep during November because of the lack of fodder in the succeeding months of the winter season.

As in Egypt the nesting holes in these English columbaria were arranged in orderly and symmetric ranks along the inner face of the walls at varying heights. When collecting fledgelings for supply to the kitchen, the usual plan was to pivot the lower end of a heavy upright beam in a socket embedded in the floor and to fit its upper end in another socket fitted to a stout beam crossing from side to side of the building on a level with the eaves. On this central beam bracket-shaped landings were fitted at different heights and at varying angles to the median vertical plane ; upon these brackets ladders of some sort were placed whenever robbery of the nests was necessary ; the arrangement ensured that any nest could be reached whenever required (4).

Usually pigeon-houses were built specifically for the one purpose—the accommodation of large numbers of these birds. Occasionally nesting places were fitted within church towers and in certain turrets of important castles. During a siege the pigeon population sometimes became an important factor in the prolongation of its defence, whenever the victualling of the garrison was endangered. Occasionally, too, the attic floors of farm houses and of the private dwellings of the wealthy, were used as pigeon lofts under the thatched roofs. Pigeon pie was a delicacy which often graced the tables of the rich in olden time, for the birds were a useful reserve whenever scarcity of venison or of game birds restricted the menu of the Lord of the Manor or when a crowd of unexpected guests had to be catered for.

As in many Egyptian pigeon-houses, the entrances for the homing pigeons were usually contrived at the apex of the vaulted roof ; often it was so designed as to become an ornamental finish to the roof, taking, for example, the form of an open lantern ; alternatively it might be the provision of dormer windows breaking through the sloping sides of the roof.

On market days at Luxor, many are the crates of squab pigeons brought to market. The vendors have a curious method of making the young birds appear plumper than they would be naturally. Often have I seen a pigeon seller doing this simple trick, carried through without any attempt at concealment. Beside him is an old tin filled with water. Watch him take a mouthful ; then lifting one of the fledgelings, he prises open its beak, places his lips against the gape and blows into its throat as much water as its crop will hold. As he blows the crop visibly swells. And when the draught is finished and he lays the bird down, it crouches contentedly, looking distinctly plumper than before it was treated ! It still puzzles me to understand what object the seller has for treating the bird in this manner. The would-be buyer must be aware of this form of ' doctoring ', for it is done openly for every passer by to see !

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[4] E. Yates, ' Manorial Pigeon Houses ' in the *South-eastern Naturalist and Antiquary for* 1943, vol. 48, pp. 15–19. London, 1943.

Preliminary Note on the Excavations at the Palaeolithic Site of Ksâr 'Akil, Republic of Lebanon

by J. Franklin Ewing, s.j.

THE Palaeolithic site of Ksâr 'Akil, a rock-shelter near Beirût containing abundant remains of Aurignacian and Levalloiso-Mousterian occupations, was originally brought to the attention of scientists as the result of the activities of treasure hunters. Two energetic seekers after buried riches engaged in a search for a hidden cave rumoured to be in this vicinity. They sank a shaft through the prolific occupation layers close to the wall of the shelter. The flint tools and the faunal remains found during the course of this work were recognized as such by Professor Day of the American University of Beirût, who later sent specimens for detailed study to London and Paris (1). The site was also visited by Passemard's expedition in 1926 (2), and observations on it and the artifacts collected by Day were published by Delcourt (3).

The Rev. Joseph G. Doherty, s.j., of Boston College, Boston, Massachusetts, began the present extensive excavation on the advice of M. l'Abbé H. Breuil in the summer of 1937 (4). The substance of the remarks on the prehistory of the site included here are due to Father Doherty, as well as much of the section on geology; the balance of the paper has been improved as the result of his reading and suggestions. The composition of this paper has benefited immensely from the generous and experienced assistance of Dr Hallam L. Movius, Jr., of the Peabody Museum, Harvard University.

The writer joined Father Doherty at the site in 1938, and acted as palaeontologist and anthropologist. This 1938 season was the last of active digging before the war caused a temporary cessation of the work. Since the project is to be resumed during the summer of 1947, largely through the generosity of the Viking Fund of New York, and further developments therefore may be expected, it seems appropriate at this time that a note on the results achieved to date, and on the prospects of this site be made available.

A very preliminary note is the most that can be compiled at present. The exigencies of war necessitated leaving the artifacts, fossils and records at the site. For this reason no detailed study of the remains found to date has yet been made.

Location and General Nature of the Site

Ksâr 'Akil is situated in the Valley of Antelias, which is named after the small coastal town that spreads over the narrow littoral plain, at the point where the valley debouches onto that plain. This town lies six kilometres in a northeasterly direction along the Bay of St. George from Beirût, the capital of the Republic of the Lebanon, as shown on the map (fig. 1). To reach the site, one leaves the coastal road at Antelias and follows a branch road, running in general towards the east, for something over one kilometre. The Aïn, or Spring, of Antelias is located near the town in a pleasant, tree-shaded hollow. From here the site is about eight minutes' walk further into the hills by foot trail.

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[1] Day, 1924.
[2] Passemard, 1927.
[3] Delcourt, 1927.
[4] Compare Murphy, 1938; 1939.

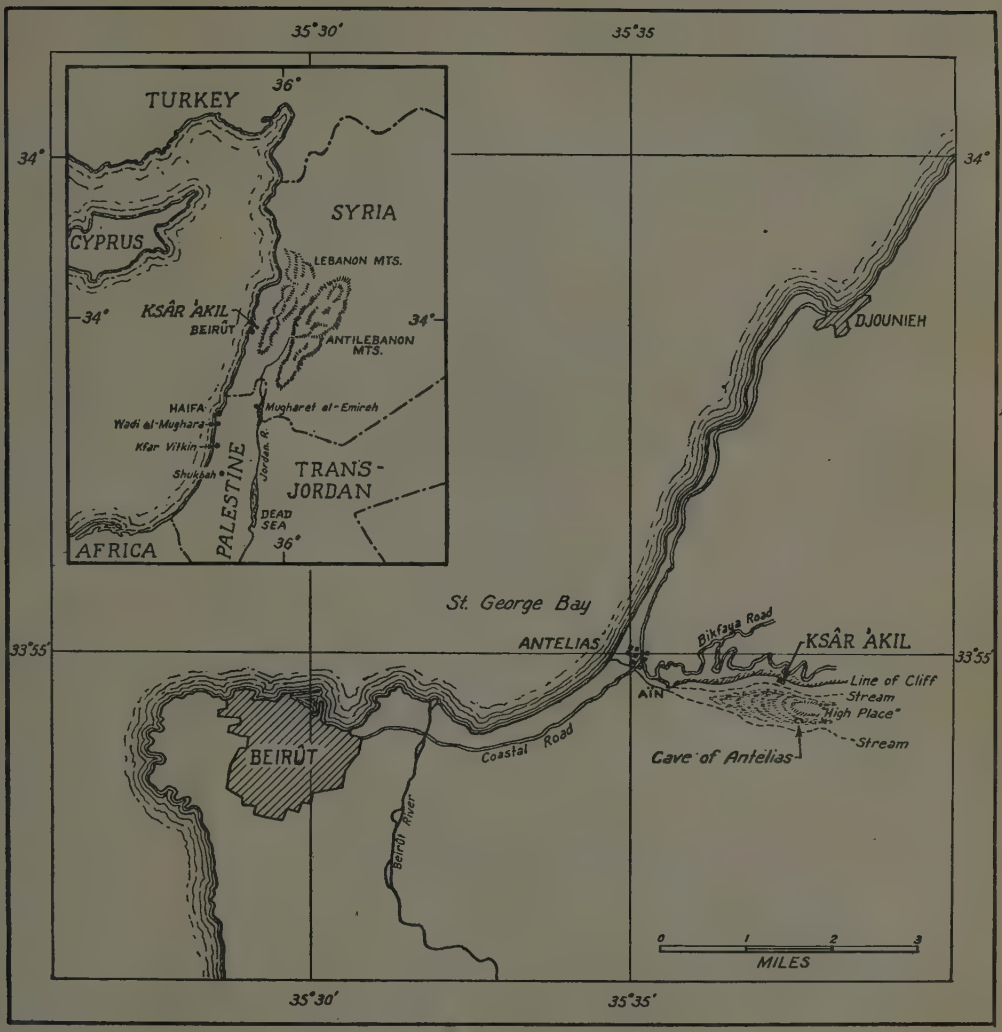
35°30'
35°35
TURKEY
36°
34°
SYRIA
CYPRUS
LEBANON MTS.
KSÂR 'AKIL
BEIRÛT
ANTILEBANON MTS.
HAIFA
Mugharet el-Emireh
Wadi el-Mughara
Kfar Vitkin
Shukbah
Jordan R.
TRANS-JORDAN
PALESTINE
DEAD SEA
AFRICA
DJOUNIEH
St. George Bay
ANTELIAS
Bikfaya Road
KSÂR 'AKIL
33°35'
AIN
Line of Cliff
Stream
"High Place"
Stream
Cave of Antelias
BEIRÛT
Coastal Road
Beirût River
0
1
2
3
MILES

FIG. 1

The valley bifurcates at a rounded hill, on top of which is a modern Semitic ' high place ', indicated on FIG. 1. On the north wall of the main valley the Cave of Antelias (5) is located. The northern side of the north branch of the valley harbours our site, a rock-shelter which faces south.

The basic rock in this vicinity is Jurassic limestone, which is partially metamorphosed. The peculiar tilted and eroded formation above the shelter, as well as the site itself, was probably formed in the process of the underground erosion of a huge forked vault. It would seem that this latter collapsed, thereby commencing the formation of the forked valley as we find it today. Apparently the tilting was not complete until Early Pleistocene times. It was the existence of a similar formation above the portal of the Cave of Antelias that led the original treasure hunters to suspect the presence of an analogous hidden cave at Ksâr 'Akil.

A small intermittent stream runs rather steeply down the north fork of the Valley of Antelias, its gradient becoming less steep just before it passes the shelter.

The point on the original surface from which all subsequent calculations were made (datum) is 80.9 metres above sea-level. From a fairly level platform at this height, the hill slopes irregularly down to a small valley plain. The height of this valley plain, 66.1 metres above sea-level, is fairly accurate, and corresponds very closely with the level of the plain in the southern or main branch of the valley. The lowest point in the bed of the intermittent stream in the plane in which our section is drawn (see FIG. 2) is 62.2 metres above sea-level. The lowest point we reached in our excavations of the season of 1938 was 19.0 metres below datum and we therefore conclude that this lowest point in the shaft is 61.9 metres above sea-level, or actually below the bottom of the present stream bed.

Fortunately the deposits at Ksâr 'Akil were undisturbed by seismic action or other agencies, outside the area of the treasure hunters' shaft. On the whole, the various layers were fairly horizontal near the wall of the shelter and sloped gently toward the valley. Thus, in general, excavation proceeded normally. Some difficulty was experienced in the uppermost levels with several layers which lay under large boulders. These boulders had become detached from the face of the cliff above the shelter and impacted the layers immediately beneath their fall. The most long-enduring difficulty, however, was the removal of the large amount of breccia, which clung to the wall of the shelter, and in general averaged from 30 centimetres to 50 centimetres in thickness from front to back. This breccia was usually very well consolidated. The presence of many artifacts and bones afforded frequent planes of cleavage, and, although the bones were easily broken, this fact proved somewhat helpful.

At — 18.3 metres a layer of extremely hard and refractory material was encountered. This consisted of cemented and consolidated earth, and offered the greatest problem of excavation encountered at the site. There were solidified ash, bones and artifacts in this horizon, although not in such quantity as we had become accustomed to in the overlying deposits. The effect of applying a sledge-hammer and drill to this material was the production of numerous very small flakes of material, an effect laboriously attained and on the whole unsatisfactory. Special methods have subsequently been proposed for removing this material, and these will be tried out during the coming season.

The difficult nature of this layer, in addition to the exhaustion of funds and the coming of the winter rains, caused us to bring the season of 1938 to a close without having

[5] Zumoffen, 1893 ; 1900, pp. 49–87.

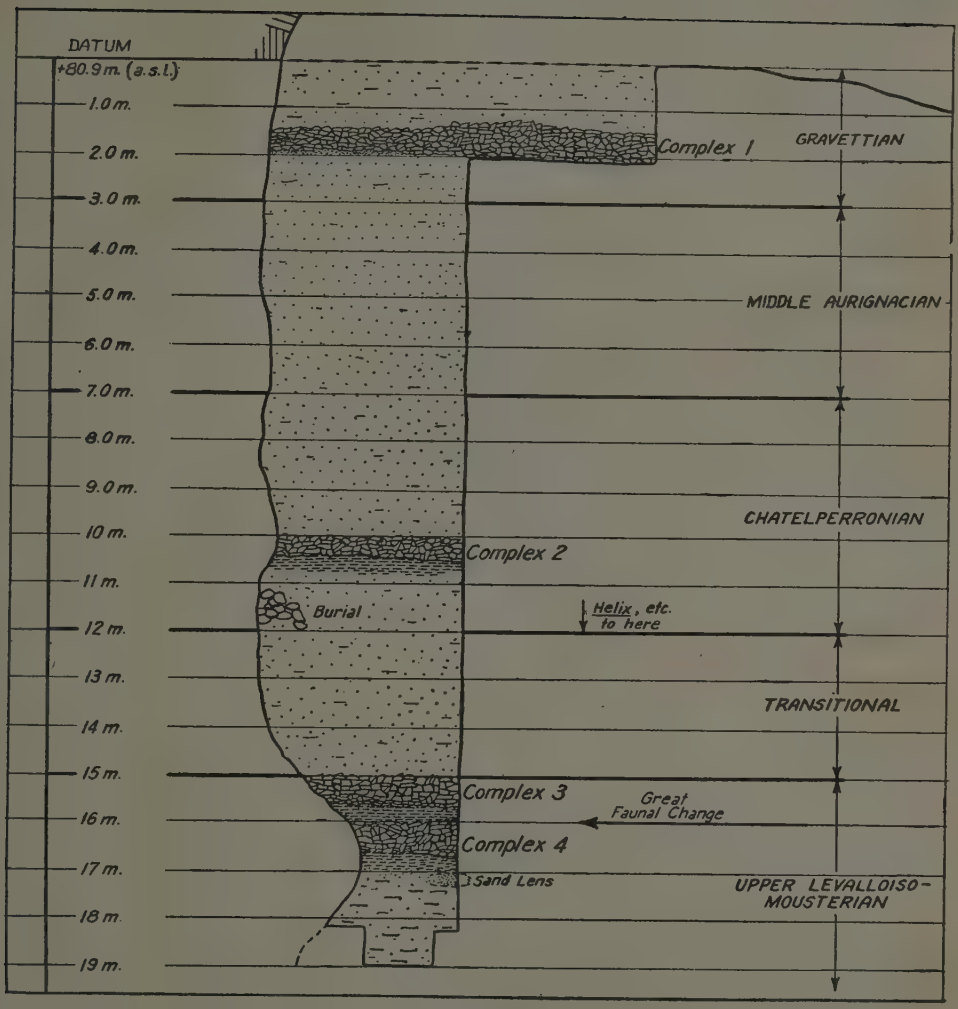
DATUM
+80.9 m. (a.s.l.)
1.0 m.
2.0 m.
3.0 m.
4.0 m.
5.0 m.
6.0 m.
7.0 m.
8.0 m.
9.0 m.
10 m.
11 m.
12 m.
13 m.
14 m.
15 m.
16 m.
17 m.
18 m.
19 m.
Complex 1
GRAVETTIAN
MIDDLE AURIGNACIAN
CHATELPERRONIAN
Complex 2
Burial
Helix, etc. to here
TRANSITIONAL
Complex 3
Great Faunal Change
Complex 4
Sand Lens
UPPER LEVALLOISO-MOUSTERIAN

Fig. 2

ascertained whether or not we had reached the base of the cultural horizons at the site. But, since at —19.0 metres we are already slightly below the level of the stream bed in the valley, the bottom cannot be far off.

With the exception of the layer of cemented earth, and of several other unusual layers which we shall discuss below, the matrix of the main deposit thus far encountered was composed entirely of earth, and, below —15.0 metres, of clay. In addition, all layers contained a large amount of ash. As will be observed, the nature of the cave earth was such as to enable us in general to apply careful and more than orthodox excavating techniques without losing any time. Fortunately, the earth and clay were sufficiently compact to obviate the necessity of shoring up the walls of the shaft.

The site was laid out in two-metre squares. The area of the actual excavation varies from eight of these squares at the surface, to one at the bottom, although for the greater part of its depth the shaft is at least three squares in horizontal extent. One square was pinched out by a markedly forward bulge of the wall of the shelter, which began approximately at —14.5 metres. The deposits, which as previously stated include Aurignacian and Levalloiso-Mousterian culture horizons, proved to be uniformly and incredibly rich in artifacts and animal bones. The flints already removed number close on 2,000,000 (counting both artifacts and rejected fragments, trimming flakes, etc.) and there are well over 1,000,000 pieces of bone. Insofar as these have been studied, the rejects as well as the retained specimens have been counted and recorded by square and level. It is hoped that this method will eventually furnish a rough measure of the intensity of habitation during the successive periods of the occupation of the site by man. During the process of excavation, the diggers placed the flints and bones they noted into marked bags; the rest of the material from the layer was sent to the sieves. Both diggers and sieve-men became very skilful at descrying even the smallest specimen. This was particularly striking when the clayey layers were reached, since in this difficult deposit the sieve-men would pick out tiny bones of microfauna with amazing verve.

Prehistory

As stated above, a plethora of flint tools was found, but worked bone was extremely scarce, and, if it occurred at all, was in the very uppermost layers. Several grinding-stones used in triturating ochre were encountered in the Middle Aurignacian and Gravettian layers. Throughout the Upper Palaeolithic deposits, numerous hearths appeared; these were often several metres in depth. The hearths of the Levalloiso-Mousterian horizon were shallow and black, whereas those of the Upper Palaeolithic were gray. No objects of art were obtained.

As the excavation proceeded, thirty-four layers were discriminated, primarily on the basis of geological criteria, such as colour and texture of the earth. The cultural material from the various archaeological horizons seemed to correspond with these divisions very closely. In this preliminary note, however, we shall remark only on the main divisions of cultural significance, since our detailed records are not available at the present time. The main archaeological divisions recognized to date are indicated on the accompanying section (FIG. 2); they may be summarized as follows:

Gravettian: From 0.0 to —3.0 metres the Gravettian, with the usual assemblage of tools of this period, is found. Worthy of note, however, is the presence of Font-Yves points of identical type with those found at the Mugharet el-Wad (Level E), (6) associated

[6] Compare Garrod, 1937, Plate XXIII, nos. 13–16.

with the base of the Middle Aurignacian in Palestine. (7). Also noteworthy is a number of small points, more like barbs than anything else. Tools somewhat similar have been noted at Magosi (8), and identical ones are illustrated from Beni Segoual (9). In this division, the large number and great artistry of the denticulated scrapers is also remarkable ; these resemble the single one illustrated from the Mugharet el-Emireh (10).

Middle Aurignacian : From —3.0 metres to —7.0 metres we are in the presence of the Middle or true Aurignacian, very typical in nature. The main advantage that Ksâr 'Akil offers with regard to the study of the Aurignacian is the tremendous richness in tools and the great depth of the deposits. A statistical study of the various subdivisions based on very large numbers of tools therefrom, should prove to be fruitful. Apart from the usual tool-types, we should remark here on a special facies containing many small burins, which occurred near the top of this division. There are also small triangular angle burins, such as those Stekelis has found above the solidified dunes at Kefar Vitkin (11).

Chatelperronian : From —7.0 metres to —12.0 metres the typical Lower Aurignacian or Chatelperronian occurs. Chatelperronian points of classic form (12) are particularly frequent at the base of this division.

Mixed Zone : The levels from —12.0 metres to —15.0 metres are puzzling, and they have not yet been studied in needed detail, since they were unearthed towards the end of the last digging season. Here we clearly have a mixture of Levalloiso-Mousterian and Aurignacian type tools, although the true Chatelperronian definitely fades out at —12.0 meters. It is anticipated that the material from these 3 metres of deposit will reveal many startling relationships.

Upper Levalloiso-Mousterian : From —15.0 metres to the base of the pit, i.e. to a depth of —19.0 metres, we have the same Upper Levalloiso-Mousterian as that found at Mount Carmel (13). However, an Emireh point (14) and a second point, which resembles an Audi or broad Chatelperronian type, were found side by side at —15.2 metres in a cultural horizon that appears to be very much earlier than the one in which they occur at Mount Carmel.

Again it must be emphasized that the extraordinary thickness of the deposits, and the tremendous number of artifacts found in them make possible a study that is bound to result in the recognition of fine and statistically-based distinctions between the temporal subdivisions of each culture.

Palaeontology

The two most striking faunal phenomena exhibited at Ksâr 'Akil are : (*a*) the presence of large numbers of snail shells down to —12.0 metres, and their absolute disappearance below that depth ; and (*b*) the great change in the components of the vertebrate fauna which occurs at —16.0 metres.

Shells of a species of *Helix* are found in great profusion from the surface to a depth

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[7] Garrod, 1937, pp. 47–8.

[8] Wayland and Burkitt, 1932.

[9] Arambourg, Boule, *et al*, 1934, especially Planche VII, nos. 8, 22 and 24.

[10] Turville-Petre, 1927, Plate V, no. 24.

[11] Stekelis, personal communication.

[12] Such as those illustrated in Garrod, 1937, Plate XL, nos. 5 and 6 ; Plate XXIII, no. 12.

[13] Compare Garrod, 1937, pp. 73–4.

[14] As illustrated in Garrod, 1937, Plate XXVI, nos. 1–3 ; Plate XXVII, nos. 7 and 8.

of —12.0 metres. Beneath this level they are completely absent. It is obvious that the folk that occupied the shelter during the time represented by the upper 12.0 metres of deposits ate snails in very substantial quantities whereas those of the lower levels did not eat them at all. Below —12.0 metres only three specimens have been found thus far, and, since these were all widely separated, it is apparent that the shells in question were left by snails that invaded the area under their own power. In addition to land snails, sea shells are also represented, the greater number being *Patella* and *Trochus*. Shells of *Littorina* and *Cardium* occur, but in very limited numbers. An occasional *Cardium* shell in the Aurignacian and Gravettian deposits might have been perforated at the apex for suspension as an ornament, but it is difficult to be certain whether or not this was done designedly by Man.

It was at first thought that frequency distribution curves of the various types of mollusca might be useful in suggesting climatic changes, on the basis of the presumption that a mollusc-eating population would seek sea forms during a period when a dry climate rendered land molluscs rare. But there is absolutely no opposition between the curves for the land and the sea shells ; they both follow the same pattern. The two types of shells are absent together, and together they attain peaks of high incidence at interesting, but not immediately illuminating, levels, i.e. at —4.0 metres, —9.3 metres and —11.25 metres respectively. Thus we have one peak in the upper portion of the Middle Aurignacian, and two in the Chatelperronian. In the horizons between these peaks the shells practically disappear. Indeed, at present no discernible correlation exists between vertebrate palaeontology and geology on the one hand, and these frequencies of shells on the other. Hence it is suspected that cultural factors played the decisive rôle in determining the amount of shell-food consumed at different times during the Upper Palaeolithic occupation at Ksâr 'Akil. At all events, the disappearance of these shells at —12.0 metres strengthens the conclusion reached from the observation of the typology of the artifacts, namely, that at this depth is found the true base of the Chatelperronian division at the site.

As regards the molluscan and vertebrate faunal remains, an important overall remark must be made. This site is a rock-shelter and not a true cave ; therefore, any faunal material found at the site, with rare exceptions, was brought into the site for food by ancient man.

The mammalian fauna is familiar to students of the Late Pleistocene of this area. *Dama mesopotamica*, *Capreolus capreolus*, *Capra* sp., *Gazella* sp., *Sus scrofa*, *Bison* sp. and *Bos* sp. are noted (with the exception that *Bison* and *Bos* are absent in the uppermost levels) from the surface down to —16.0 metres. The incidence of *Bison*, *Bos* and *Sus* increases notably below —12.0 metres and the sparse remains of *Ursus arctos* and *Ursus spelaeus*, as well as an occasional tooth of *Panthera pardus*, are also found towards the —12.0-metre level. No count has yet been made of these remains, but such a study will be made later. At present, however, we have sufficient information from mere observation to hazard the opinion that these data when compiled will corroborate the conclusions based on the Mount Carmel material (15).

At —16.0 metres and below isolated teeth of *Rhinoceros* cf. *hemitoechus* (16) are found. There is also a larger deer, *Cervus elaphus*, and just below —16.0 meters one comes upon a number of disparate remains of microfauna—*Cricetinae* and the like. This microfauna, however, fades out almost completely at —16.6 metres, and does not

[15] Bate, 1937, pp. 141–2, and 143 ff.

[16] Illustrated in Bate, 1937, p. 223, Fig. 8, j-m.

reappear in the underlying deposits down to the base of the pit at — 19.0 metres. *Bison*, *Bos*, *Cervus* and *Capra* continue to the lowest point reached. It is interesting to note that no remains of marine animals were recovered. Also absent were the tail bones of the animals represented in the collection.

Palaeo-anthropology

Probably two complete human skeletons were found at Ksâr 'Akil. The reason for the qualification ' probably ' lies in the nature of the deposit in which the human remains were discovered. The skeletons, or, to be most conservative in expression, we should perhaps say the visible osseous remains, were deliberately buried. They reposed under a pile of water-worn boulders, which had been heaped over them and against the wall of the shelter (FIG. 2). The base of this boulder heap as excavated was at — 11.46 metres : the lower portion of the Chatelperronian horizon. Most of the skeletal remains lie somewhat deeper than this—how much we have not yet determined, for these burials are still *in situ*, though well protected by a covering of concrete.

The entire area of the deposit containing the skeletal remains and the boulders was strongly consolidated. The child's skull, which we somewhat irreverently and provisionally named ' Egbert ' (**17**), lay half in and half out of this consolidated area. As the boulders were removed one by one, a stone was reached which rested on the skull. Position and condition strongly suggested that this stone had been balanced on two others over the head of one of the corpses at the time of burial and had fallen against the skull before any consolidation had set in. The removal of this stone also revealed another set of teeth belonging to an individual about the same age as the one represented by the skull, that is to say about eight year old in life.

Further boulders were removed, and the ends of long bones (one pre-adolescent femur, a radius and ulna, as well as parts of ribs) were exposed. At this point it was decided to collect the loose fragments and store them, but to await the disengagement of the other remains until the entire burial could be removed in one block, since it was apparent that the delicate work of cleaning and extracting the individual bones could best be performed in the laboratory. From the little that could be observed at the time, a few remarks concerning the remains can be made (**18**). The brain-case of the skull is obviously within the range of Modern Man as regards capacity and thickness of the vault walls, and no supraorbital ridges were observable. The teeth are quite macrodontic and very high-cusped. The dental arch is large ; the mandible heavy for the age, in comparison with Modern White Men and with the delicacy of the brain-case. There is no mental prominence. On the other hand, the symphyseal section outline is not of the Neanderthaloid pattern. In the straight up-and-down anterior symphyseal profile and in heaviness, the mandible resembles that of some New Caledonians (**19**), among Modern Men. It is to be hoped that these skeletons, when fully studied, will reveal interesting relationships with the fossil human skeletons found in the Upper Levalloiso-Mousterian horizons of Mount Carmel (**20**).

Geology

Four layer-complexes of extreme interest were found at Ksâr 'Akil. At — 1.5 metres a deposit consisting almost entirely of stones, called Complex 1, was uncovered (see PLATE III). These stones are small, angular and closely packed, offering no

[17] Ewing, 1947.

[18] See also Ewing, 1946.

[19] Sarasin, 1922, Tafel LIX, no. 7.

[20] Keith and McCown, 1939.

evidence whatsoever of having been water-borne or introduced by human agency. They evidently resemble in appearance the stones of Layer D of the Grotta Romanelli, on the coast of Apulia (21). Some red clay was found in the interstices of this layer, indicated on the section (FIG. 2 and PLATE III); it was about 50 centimetres thick at its maximum thickness.

At — 10.0 metres a somewhat similar stone bed was unearthed, Complex 2 on the section (FIG. 2). In this case, however, the stones were strongly cemented together with druzy calcite—i.e. small crystals of calcium carbonate. The cementing action of the calcite was so effective that it took the workmen an entire day to drill through and remove two square meters of the material. The stones themselves comprising this horizon were of the same small angular character as in the case of Complex 1. This stone layer averaged 30 to 40 centimetres in thickness, and underlying it was a stratum of red clay, 20 to 40 centimeters in thickness. This clay was the most nearly sterile of any of the layers at the site as regards artifacts and bones, with the exception of a very small sand lens, apparently water-laid, found at — 17.0 metres. The fact is borne in on one that this layer formed a sort of ' lid ' over the human skeleton, thereby helping to reduce to an almost non-existent quantity the danger of these burials being intrusive.

Another complex very similar to Complex 2 was encountered at — 15.0 metres; this was designated Complex 3 (see FIG. 2 and PLATE IV). In this case, the stones were also cemented together, not with druzy calcite, with the same general material (i.e. calcium carbonate) that formed the cementing agent in the breccia against the shelter's wall, and did not form such numerous and visible crystals as the former material. This layer was by no means as difficult to remove as the stone layer of Complex 2, although it was approximately as hard as the usual breccia. The clay layer of this complex resembled that of Complex 2, and in it were found a number of artifacts, including the Emireh point mentioned on page 191.

Immediately underlying the clay layer of Complex 3 appeared another stone and clay complex at — 16.0 metres (Complex 4; see FIG. 2 and PLATE III). The stone layer of this basal complex was less firmly cemented than that of Complex 3. The chief differences lay in the facts that (*a*) a noticeable amount of clay was mixed in with the stones from the very top of the stone layer, and (*b*) the clay stratum below the stones was scarcely demarcated at all from the stone layer on the one hand, and the immediately underlying deposit, which was largely clay, on the other.

It is our opinion that these peculiar complexes were laid down during periods of greatly increased precipitation. This interpretation was corroborated in fact by each of several competent geologists who visited the site. The small angular stones must have been detached from the roof of the shelter by the agency of varying humidity. The great probability of the expansive action of crystal growth in the cracks of the parent limestone mass must also be considered. The effect thus produced was apparently quite akin to what is known as exfoliation in other climes. Not only are detachment scars clearly visible today on the roof of the shelter—an observable fact which supports the interpretation given above—but, in the case of Complex 1, the stones are actually heaped up in a line which runs directly beneath the edge of the overhang of the cliff above the shelter.

The clay layers associated with Complexes 2, 3 and 4 are red, as is the soil of the country roundabout. The clay is formed of disintegrated limestone, the red colour being due to the presence of iron oxide. Thus the clay layers of our various complexes

[21] Blanc, 1921; 1930.

are the result of decalcification. The mere presence of the clay alone, even without the concomitant stone layers, is indicative of increased humidity.

If our complexes represent periods of increased precipitation, and there is no valid reason for not believing that such is the case, then it should be justifiable to attempt to correlate them with the various pluvial and glacial episodes established elsewhere. Any such correlation is of course extremely tentative at the moment, but nevertheless one cannot resist setting down the following remarks on the subject as a working hypothesis. On this basis, and also in view of the results of the faunal analysis of the Mount Carmel material (22) including its climatic implications, we suggest the following correlation :

(*a*) Complex 3 and Complex 4 together represent a period to be linked with the first phase of the Fourth Glaciation (Würm I of the Alps). The great faunal change here, as well as what is known concerning the age of the cultural layers, inclines us to this opinion.

(*b*) Complex 2, then, would correspond in sequence with the second phase of the Fourth Glaciation (Würm II of the Alps), which seems to agree with the faunal evidence at Mount Carmel, and with the general age of the Chatelperronian in the Middle East and elsewhere, although we might well have expected it somewhat earlier here.

(*c*) Complex 1 in turn may be correlated with the third phase of the Fourth Glaciation (Würm III of the Alps). Although there is no supporting evidence for this phase at Mount Carmel, the period represented by this complex could hardly have been later, in view of the typological and cultural affiliations of the artifacts.

During this coming season we are happy to announce that we will have with us a full-time geologist, Professor Herbert E. Wright, Jr., of Brown University. His express objective will be a study of our site and its geologic age in terms of the beaches and terraces of the Lebanese coast. The results of his work should contribute greatly to the formulation of a synthesis which should be of wide interest and application with regard to the study of Early Man and Pleistocene chronology in the Middle East. Professor Wright's participation in this work has been made possible by the generosity of the Oriental Institute of the University of Chicago.

SUMMARY

The site of Ksâr 'Akil, near Beirût, Republic of Lebanon, contains remains of Aurignacian (Gravettian, Middle Aurignacian and Chatelperronian) and Levalloiso-Mousterian occupations, a transitional or mixed zone promising new and interesting data. This sequence is revealed in some 19.0 metres (over 62 feet) of deposit, the base of which has not yet been reached. The fossil material is typical of the time and region ; the differentiation of Aurignacian and Levalloiso-Mousterian on molluscan evidence is striking, while the vertebrate remains permit of climatic studies. Two human skeletons, at least in part, were found at the base of the Chatelperronian. Although both represent children, they nevertheless will add to our knowledge of Upper Palaeolithic Man in the Middle East. The geology of the site provides evidence of at least three periods of increased precipitation, which presumably may be correlated with glacial periods elsewhere. The work on the site is to be resumed during the 1947 season.

[22] Bate, 1937 ; Zeuner, 1945, pp. 196–200.

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PLATE I

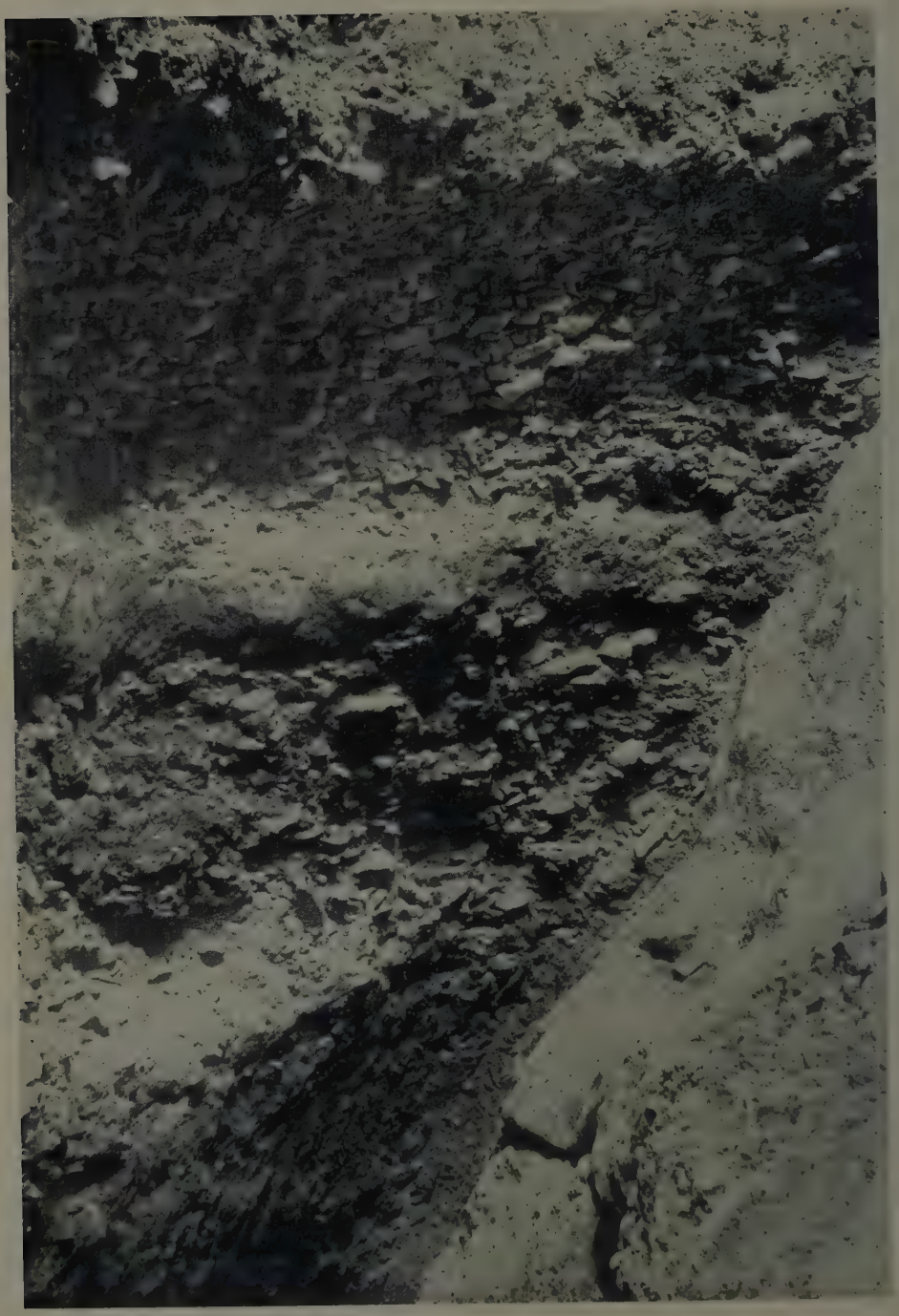
FRAGMENTS OF BONE SPEARHEADS AND WAVY-LINE POTSHERD FROM EARLY SITE AT KHARTOUM

facing p. 106

PLATE II

ONE OF THE LARGEST PIGEON-HOUSES IN THE LUXOR NEIGHBOURHOOD

DEPOSIT OF CLOSELY-PACKED STONES AT KSÂR 'AKIL



STONES AT KSÂR 'AKIL CEMENTED TOGETHER WITH DRUZ CALCITE

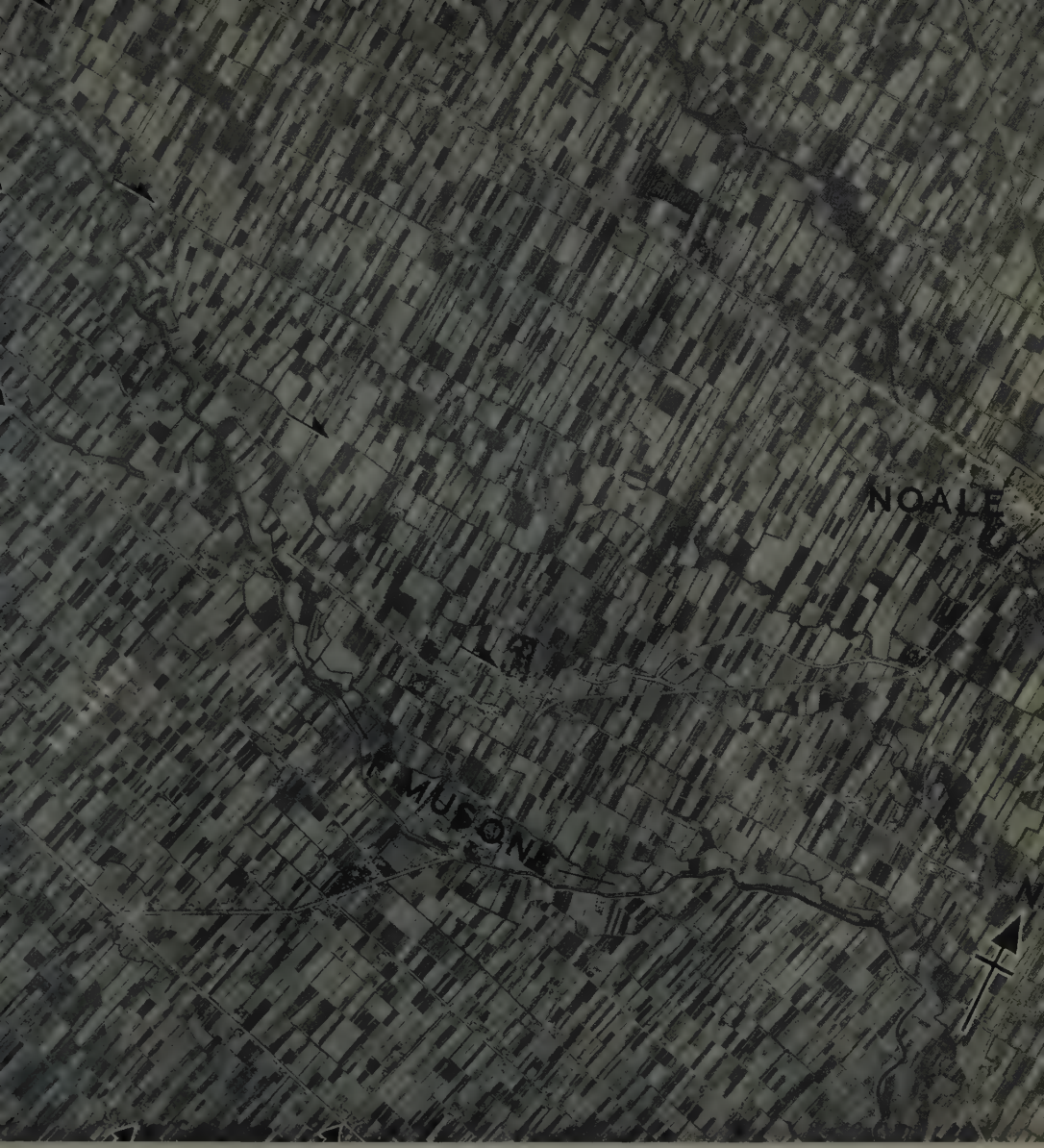


PLATE V

FIELDS 12 MILES NE OF PADOVA

showing parts of two adjacent systems of centuriation. Their *centuriae* differ in size and orientation. *Decumani* and *cardines* are shown by black arrows, examples of *limites intercisivi* by white ones. Area covered = 4 square miles

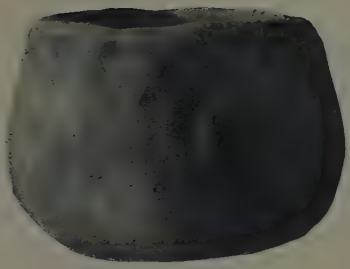
PLATE VI

FIELDS AT ZARA, DALMATIA

showing *centuriae* preserved by roads and field boundaries—good examples of units of 200 *jugera* (710 metres square)

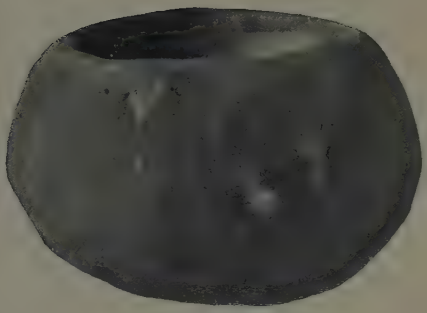
PLATE VII

1



2

3



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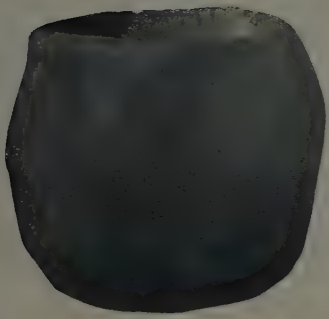

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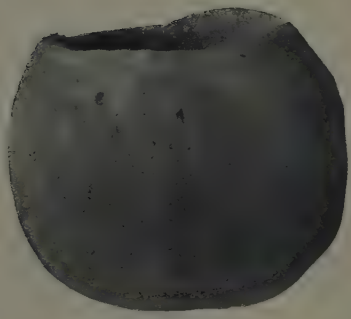

6

TIREE CRAGGANS (half size approx.)

1. From Sandaig, said to have been made by Flora Brown
2. From Balevullin, made by Hugh MacNeil's mother
3–6. Made by Hugh MacNeil in 1942

(Note milk stains on nos. 3 and 4)

A Technique for the Study of Centuriation

by John Bradford

In the last century of the Republic and in the first of the Empire, few things better display the arbitrary but methodical qualities in Roman Administration than the practice of *Centuriatio*. With an absolute self-assurance and great technical competence, the same formal topographical framework of land-division was superimposed on lush alluvium and near-desert, in a nicely balanced blend of the doctrinaire and opportunist. It will be readily recalled that in the Central Mediterranean region, wherever continuity of cultivation was not over-violently disturbed, this system often survived (in skeleton form) to establish itself usefully and thus successfully in the present field- and road-pattern. The durability of some of the smallest details of the units of division has shown how well they were suited to their environment. Such purposeful dissection of suitably flat areas for intensive farming was scarcely surpassed in formal precision by the 19th century land-partitions in North America, or by the systematization of the Great Alföld after the Ottoman tide had receded from Hungary. Land surveyed by the method of Centuriation was assigned under several forms of ownership and economic status, but our present investigation is only concerned with the type of *ager centuriatus* or *limitatus* apportioned as private property among the members of a new *colonia*. The component-unit usually employed by the field-surveyors (*agrimensores* or *gromatici*) for this purpose was the *centuria quadrata*, measuring 710 metres (776 yards square).

Let us retain this solid mental image and momentarily rest content with a delusively simple generalization. Now, it is natural that a graticule originally composed of such large units may only survive imperfectly, with occasional distortions and *lacunae*; but, equally, these *centuriae* when preserved, skeletally, will normally stand out distinctly from the heterogeneous details of the modern field-pattern, which are quite different in character. Large topographical sub-divisions of this kind are, therefore, studied with particular facility on air-photographs (1); and the method followed will essentially be that of the anatomist dissecting a specimen, concerned with surviving structural traces, vestigial though they sometimes are, and not with the complexities of the legal, fiscal and administrative aspects about which one looks to the Historian for guidance. Of course, the topographical evidence soon becomes closely involved with the study of the agricultural methods and technology (2) of the Roman world, in relation to which it only becomes fully intelligible. In recent years there has been a perceptible inclination to ' get down to earth ' and to concentrate further on the material remains of Centuriation

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[1] The illustrations are reproduced by kind permission of the Air Ministry. I should especially like to thank Miss E. A. O. Whiteman for her contributions to their study, and Mr C. E. Stevens for helping to assess the evidence from them. My obligation to that authority on Centuriation, Professor Plinio Fraccaro, Rector of the University of Pavia, will, I hope, appear in the text.

[2] See, in particular, C. E. Stevens's chapter in vol. 1 of the *Cambridge Economic History*, with bibliography.

in the field (3). This is the most hopeful approach to the solution of the notoriously vexed questions in the writings and diagrams of the Roman surveyors themselves (4).

Air-photographs have a dual rôle in the study of this subject; *illustrative* and *analytical*. On the ground it is practically impossible to photograph Centuriation effectively, but the air-camera is in a position to record, impartially, *all* topographical features on the surface and some that now lie immediately below it (i.e., in the form of crop-marks). On maps, place-names and symbols restrict the space available for inserting field-boundaries and details of terrain; and an element of artificial selection is thereby introduced that does not affect the photographs (5). With the full paraphernalia of walls, hedges, ditches, etc., before our eyes, we are operating with a much wider and more complete range of facts. Such small structural details, though of a Lilliputian importance, often possessed surprising topographical stability, and prove of great value in filling gaps in the less well-preserved areas of Centuriation and, still more usefully, give indications of former internal sub-divisions within the *centuriae*. The only limiting factor is that of scale, and valuable work can be done with air-photographs of up to 1 : 50000 (though about 1 : 20000 is the optimum). But it is not merely a matter of studying more closely the ' comparative anatomy ' of the *agri centuriati* that are already known. Whole systems can be revealed and reconstructed for the first time; Zara is a good example, and there is little doubt that others await discovery from the air. Professor Fraccaro (6) has drawn an interesting analogy between the period of discovery and study of Centuriation that followed the arrival of more accurate maps in the mid-19th century, and the similar expansion in knowledge of the subject that will probably accompany the extensive use of air-photographs, either examined directly as a primary documentary source, or *via* large-scale maps prepared and corrected from them. The signs are encouraging. At Carthage, Florence, Pola, Capua and SW. of Treviso, long familiar systems of *agri limitati* have given up additional information; while on the Tavoliere di Puglia, a great area of centuriated fields, which had structurally so completely vanished from the face of the countryside that they ceased to exist from the ground observer, can now be restored archaeologically from the alignment of their filled-in boundary ditches, as revealed by crop-marks seen on air-photographs. At first glance, one can scarcely credit the comprehensive nature of the system disclosed,

---

[3] This has been done by Prof. Fraccaro with notable effect and a skill that has robbed the subject of its terrors, in the following :—' La centuriazione romana dell'agro Pisano ', in *Studi Etruschi*, XIII, 1939; ' Centuriazione romana dell'agro Ticinense ', in *Atti e Memorie del Quarto Congresso Storico Lombardo*, 1940; ' Intorno ai confini e alla centuriazione degli agri di Patavium e di Acelum ', in *Studi di Antichita Classica offerti a Emanuele Ciaceri*, 1940; ' La colonia romana di Eproredia (Ivrea) e la sua centuriazione', in *Annali dei Lavori Pubblici*, 1941; see also his article ' Agrimensura ' in *Enciclopedia Italiana*.

[4] Blume, Lachman, Rudorff, *Die schriften der römischer Feldmesser*, (vol. I, texts; vol. II, commentaries), 1848–52. There is a later edition, by Thulin, of the texts and diagrams, *Corpus Agrimensorum Romanorum*, Leipsig, 1913. The professional opinion of the modern surveyor can be most enlightening, and De Caterini's study of the subject is valuable, i.e. ' Gromatici Veteres :—I technici erariali dell 'antica Roma ', in *Revista del Catasto e dei Servizi Technici Erariali*, 1935, pp. 261–358.

[5] During the war I have known air-photographs to be torn up, because they did not agree with the map !

[6] ' I progressi della cartografia ebbero sotto questo aspetto un' importanza paragonabile a quella che oggi ha assunto per le indagini di topografia storica l'esplorazione dall'aéroplano, ma non furono sufficientemente sfruttati ', *Studi di Antichita Classica offerti a Emanuele Ciaceri*, 1940.

but there is no doubt about it. The presence of farm-buildings, roads, boundary-ditches, and a startling variety of agricultural *minutiae*, open up remarkable prospects of excavation ; and, as *chirurgiens du terrain*, we should be able to determine empirically, by direct examination, many features which the books of the *agrimensores* have left uncertain.

Let us arm ourselves for an analysis of the discoveries at Zara with some necessary and undisputed facts about the practice of *Limitatio* (7). The structural foundation of the chess-board grid of *centuriae* (8) lay in the two primary roads constructed as base-lines for the remainder, intersecting at right angles and dividing the area into four portions, i.e. the *Decumanus Maximus* and *Cardo Maximus*, whose width was prescribed as 40 and 20 Roman feet (though narrower ones may exist). In an extreme case, e.g. Africa Proconsularis, they could be planned with a whole province in mind, or in a small colony like Zara, their length would be a matter of a few miles. Hyginus Gromaticus mentions that as far as possible they should start from a point of origin within the town itself, but failing this they should be placed as near to it as possible. Much has been written about their orientation, but the extant systems show that the theoretically desirable gave way, on the ground, to the convenient and practicable. Thus, the recommended siting of the *Decumanus Maximus* in coincidence with the sun's course from east to west, and the Cardo from north to south, was in practise adapted to suit terrain, pre-existing main roads and other considerations, as Frontinus and Hyginus admit. The system at Zara is aligned (like that at Carthage) approximately NNW–SSE, in harmony with the direction of the physical features of the North Dalmatian coast. Having set out the two axial lines the surveyors proceeded to lay down secondary roads parallel with them at set intervals, commonly of 2400 R. ft., thus forming the boundaries of the *centuriae* and giving public access to them. The points of intersection were marked with boundary stones (*termini*), inscribed or plain. Every fifth road from the centre (*umbilicus*) formed one of the *limites quintarii*, with an allowance of 12 R. ft. for its width ; while theoretically no more than 8 R. ft. was set aside for each of the termediate *limites linearii*, or *subruncivi* as Hyginus called them. Schulten urged the need of corroborating these details by excavating for the road-metalling of the *limites*. This should present no difficulty on the Tavoliere di Puglia, where they are free from modern encumbrances, and the crop-marks above the flanking ditch on each margin shows with complete clarity on air photographs. Several have been measured from the photographs and have a width of *c.* 12 E. ft. with ditches *c.* 4 ft. wide on each side.

The *gromatici* tell us that the *limites* were demarcated by ditches, trees, hedges, etc., but from the same sources make it clear that they proved, none the less, a frequent

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[7] Fabricius in his article on *Limitatio* in Pauly-Wissowa, *Real-Enciclopädie*, summarized the copious literature up to 1927 ; see also *ibid* (1894), *Ager, Agrimensores*. Later references will be found in Prof. Fraccaro's works, as cited above.

[8] Ancient tradition stated that the unit of land (*heredium*) originally distributed to the Romans by Romulus equalled 2 *jugera* in area. Now, a *centuria* measuring 2400 Roman feet square (776 by 776 yards) contained 200 *jugera*, or the equivalent of 100 *heredia* ; whence the name derives. The *jugerum* was the area that supposedly could be ploughed by a man with two oxen in one day. The size of a *centuria* was also expressed in terms of the *actus*, which was 120 Roman feet long (116.05 English feet). Two square *actus* (120 by 240 R. ft.) equalled 1 *jugerum*. The *centuria* that was 2400 R. ft. square, thus also measured 20 *actus* along each side, or 400 square *actus* in area. So, in practice, when working with air-photographs and maps on the structure of *centuriae* and their internal sub-divisions, one is always on the watch for linear measurements that roughly form multiples of 116 E. ft.

source of litigious disputes. Since their position was evidently often displaced a little out of the true line, either guilefully or in the passage of time, it is not surprising that we should find some side-to-side oscillation in their present course. Where the *limites* ran across broken ground, they would not be much used for roads or worked into any local irrigation, and therefore their chances of survival have been less. In some areas the minor *cardines* and *decumani* are both equally clear; but it is also noticeable that either one or the other is often much better preserved (see PLATE V). Occasionally, *centuriae* were deliberately left incomplete, and this must be taken into account when considering the outskirts of the system at Zara. It is natural that there should often be fragmentary *centuriae* along the edge of an *ager centuriatus*, because the outermost *limites* did not usually coincide with the boundary line (*finis*) round the colonial *territorium*. These pieces were termed *subsecivae*, and the name was also acquired by those completed *centuriae* which could not be completely parcelled out internally, because of unsuitable terrain (*loca inculta*). One could easily add a lengthy list of the technicalities and terminology of surveying given in the ' field-manuals ' of the *Gromatici*.

The *centuriae* at Zara are of the square type most frèquently encountered round *coloniae*, measuring 2400 R. ft. square, or 20 × 20 *actus*, with an area of 200 *jugera*. There are others at Pisa, Florence and Capua; in the Po Valley at Ivrea (*Eporedia*), Pavia, Parma, Padova, Bologna and Cesena; in the Veneto, S. of Bassano; and at Pola in Istria. But the area of the *centuria* might be varied according to the quality of the land, the amount available and the type of recipient. This is very clearly illustrated on PLATE V, which covers four square miles on the fringes of two adjacent systems of centuriation between Treviso and Padova. On the north side of the F. Musone can be seen part of an extensive area (part of the *ager centuriatus* of Altinum), bearing traces of a division into units measuring only 15 *actus* across, between the east to west lines (9). These *decumani* are well preserved, but the *cardines* have lost most of their identity in sharing the same axis as the fields themselves. This type of unit is sharply contrasted with those in the *territorium* of *Patavium*, South of the Musone, which are normal 20 × 20 *actus* units in the famous ' Graticolato Romano ', and whose *cardines* and *decumani* have survived equally well. Prof. Fraccaro pointed to a similar situation South of Asolo (*Acelum*) where the *limitatio* based on units of 21 × 21 *actus* marches with the *ager centuriatus* divided into units of 20 *actus* square. At Cremona blocks of 20 × 21 *actus* were chosen, and the Gromatici mention others of 20 × 24 *actus*, etc. In short, the original term centuria, by an extension of the meaning, came to include units differing in area and form, but employed in the same manner; and even on colonial land the Roman surveyor was evidently allowed considerable discretion in practice.

PLATE VI exemplifies the illustrative rôle of air-photographs in the study of centuriation, in that it conveys visually in a direct and comprehensive manner the salient characteristics of two distinct and differently orientated systems. But its analytical value is also apparent; for on it one can easily trace the smallest topographical details that link-up to give the direction of the *limites*. A comparison with most ordinary 1 : 25000 scale maps will show that an infinitely greater number of minor boundaries appear on the air-photographs of the same scale. It is on these features that one must often depend in the reconstruction of *agri centuriati* that have crumbled into distorted fragments. This argument can be applied with still greater force to the study of the internal sub-divisions of the *centuriae* :—the *limites intercisivi*, whose continued preservation in the matrix of the modern field system seems, like a fly in amber, almost indecently

[9] Their minimum-maximum width, carefully measured from the air photographs ranges from 1710 to 1790 E. ft., and 1740 E. ft. (very close to the average) is precisely 15 *actus*.

marvellous. Sometimes these are clear, but more often they only fully take shape when we employ the full topographical data. The 200-*jugera centuriae* at Padova, Cesena and South of Bassano (**10**) retain a division into 4 strips each of 50 *jugera* (**11**), which are always sited in the East to West direction of the systems, and air-photographs make it evident that NE. of Padova, many were again split up into two, i.e. making 8 narrow strips in a *centuria*. In the modern agriculture of the Po Valley, the *limites intercisivi* are represented by uniform boundary lines (of roads, ditches or hedges) running at right angles across the rows of small and narrow rectangular fields. Some examples, whose course can be traced in both directions, are indicated on PLATE V by white arrows. These fields all have their longer axis aligned from North to South, and within them the plough and the vines have for 2000 years taken the same direction, while trees were planted and irrigation streams fed and led on the traditional lines. It will be seen that the *limites intercisivi* have not survived in this manner in the *limitatio* on the other side of the F. Musone. As Haverfield observed in his trenchant article on ' Centuriation in Roman Britain ' (*J.R.S.*, 1918, 289) it is hard to explain in detail exactly how and why such boundaries survive in some cases and disappear in others ; ' we can only note what has happened '. In the Mediterranean, continuity of cultivation has proved capable of withstanding many disturbances, and it requires the severest pressure to loosen the tenacious hold of the peasant on his scrap of land ; but the results are sometimes more informative if he is compelled to do so. A good destruction-stratum is what most excavators paradoxically desire, and the counterpart of that in centuriation is provided by the *limitatio* on the Tavoliere di Puglia that went out of use, and has been unearthed by air-photography. How it met its end can only be settled by excavation, but we can already see from the crop-marks that the ditches of numerous *limites intercisivi* can be identified.

The potentialities were sensed years ago, but have been slow in bearing fruit. Thus, tucked away in the *Comptes Rendus de l'Académie des Inscriptions et Belles-Lettres* for 1929 (pp. 307–13) is a short but important note by C. Saumagne on the inadvertent discovery by air-photography of a large area of centuriation spread over 15000 hectares between El-Djem (*Col. Thysdrus*), and Mahdia and La Chebba on the coast of Central Tunisia ; in fact one of the very areas specially chosen for illustration by Barthel (taf. v), in his classical work on the subject (**12**). The photographs taken by the *Compagnie aeriénne française*, were of the large scale of 1 : 5000, and, to judge by the one reproduced, of excellent quality. Many traces of centuriation-boundaries were visible that had escaped the eyes of the French survey officers who had been over on the ground, and it would appear that a very considerable amount could now be added to Barthel's map of this area. These 200-*jugera centuriae* (some were divided into 4 rectangular strips), and secondary units inside them, were frequently demarcated (as at Zara) by the piled-up banks of loose stones, patiently gathered up, that form a familiar type of Mediterranean field-boundary. They could easily be distinguished on the photographs from the ' fantaisie anarchique ' of the later Arab plots. Ancient olive plantations, now vanished, had left behind a characteristic, evenly-spaced, pock-marked pattern caused by the method of planting the trees and of clearing a circle round them ; and this feature occurs prominently on air-photographs of the Tavoliere di Puglia.

[10] See Fraccaro in *Studi di Antichita Classica offerti a Ciaceri*. The 21 by 21 *actus* units of the adjacent system South of Asolo are still visibly divided into 3 strips of 7-*actus* width.

[11] The Roman surveyors describe various specimen allotments, and a four-fold division by ' Triumviral ' units is known to have existed ; see Pauly-Wissowa, *Real-Encicl.*, ' Limitatio '.

[12] See *Bonner Jahrbücher*, 1911, Taf. v.

One wonders what has happened to these air-photographs of the El-Djem area; as official documents furnished for a land-utilization survey ordered by ' décret beylical ' they ought still to be preserved. If they could be brought to light, and interpreted in detail, we should undoubtedly gain many new and otherwise unobtainable facts about the Romanization of the Province of Africa Nova.

One example will suffice to show how well centuriation can be revealed, and analyzed in detail, by this method of study. The port of Zara in Illyria, was a prospering entrepôt, thriving on coast-wise trade, for several centuries (13) before the creation of a Roman *colonia* there. The position dictated that its fortunes and energies should be directed seawards, then and since, rather than to the hinterland. The foundation of the *colonia* of *Iader* seems to date from the re-establishment of Roman authority in Dalmatia in and after Octavian's campaigns there in 35–33 B.C., from which *Tergeste* (Trieste), *Emona* (Ljubljana), Pola and probably *Senia* (Senj) also benefited with special favours (14); an inscription describes Augustus as the ' parens coloniae ', and there is evidence that it was properly equipped with the requisite officials. (P–W, *Real-Encicl.*, *Iader*). Roads radiated from it, north to *Aenona* (Nin), inland to *Nedinum* (Nadin) and *Burnum*, and south to the ports of *Scardona* (nr. Sibenik) and *Salona* (nr. Split). In subsequent history, Fate has on the whole treated it kindly. It got safely through the Dark Ages under the wing of the Byzantine Empire, only to succumb to the wanton sack of 1201 by the Fourth Crusaders, driven on by Venice. The city was laid in ruins and many inhabitants fled into Hungary rather than face the fury of the Christian army. Thereafter from 1409 for nearly 400 years, it jogged along securely under Venetian rule. Apart from the transient disaster of 1201 there seems to have been no major break in continuous cultivation for 2,000 years, and this partly explains the survival of the admirably clear system of centuriation, revealed for the first time, as far as I know, by air-photography. Not even Kandler, who was so active in tracing Limitatio in Istria, noticed it. The units are of 200 *jugera*, as commonly found in Augustan *coloniae*, and are orientated NNW–SSE to take full advantage of the coastal plain, behind which rise undulating limestone ridges, thus tracing a rough arc (FIG. 1, C, D, E, F). The soil is inclined to be thin and stony, and most centuriae are bounded by a high and broad bank of stones collected from the surface, which have literally ' petrified ' the *limites*! But behind the first limestone ridge is a valley (the Cbobnica Dolnja) filled with fertile red earth (minus, alas, the archaeologically desirable stones), and split up into many tiny fields. Here the traces, as far as they can be recovered from field-boundaries, are much fainter. *Centuriae* C1, and A2 to F2 are all incomplete for this reason, though some may have been *subsecivae*. The topography makes it very unlikely that there were any others to the NW beyond, A2 and D (Boccagnazzo village) in one direction, or SE beyond F2 in the other. The bare moorland that begins immediately Northwards and Eastwards from C1 is today barren, and does not show the least trace of Roman cultivation. It is possible however that there originally were one or two more *centuriae* in the same row as C1.

It is quite clear from the photographs that the system did not extend any further along the coast to North or South. In any case, the narrowing of the plain to a mere maritime strip at C and F would preclude this. In the third row, the line of one of the *decumani* (represented by a minor road) has become rather distorted, but later recovers

[13] S. Casson, *Macedonia*, Thrace and Illyria, p. 317.

[14] See M. P. Charlesworth, in *Camb. Anc. Hist.*, vol. X, 88; and *ibid*, p. 903 and 939 (for bibliographies).

N
A B C D E F G H
1 2 3 4 5 6
75
D
105
97
E
79
54
57
44
37
99
70
34
14
C
F
16
A
ZARA
G
B
J.S.P.B.

FIG. 1

its original course—' tutte le straddicciole di campagna tendono a divenire serpeggiante ' (Fraccaro). It is certainly strange that A4 and A5, are incompletely preserved, but large-scale air-photographs leave no doubt about this ; such accidents of ' natural selection ' have always to be reckoned with, in centuriation. In B5 and C5, recent suburbs have interfered a little with the *limites*, and also round Borgo Erizzo (G) where Catholic refugees from Moslem Albania settled in 1823. Apart from these details the system is well preserved, and especially interesting because limits can nearly be set to its area (15). It has, of course, long been believed that the town on the peninsular preserved evidence of a Roman street-plan, and that the chief thoroughfare then (as now) was the Calle Large, marked X–X on PLATE VI. It will be observed, however, that the present orientation of the town-plan and that of the centuriation are not the same.

Within the *centuriae* there are a number of field-boundaries whose alignment is parallel with the *decumani* and *cardines*. They are composed of slowly accumulated banks of stone, and stand out clearly from the meandering course taken by the majority of the boundaries which twist and turn to follow the terrain. But only three *centuriae* are divided in recognizable proportions. Of these, A3 is exactly bisected by a medial line ; B3 contains three consecutive strips of equal width, each being 1–10 of the *centuria* and G4 is also split into two halves, one of which is itself bisected equally. This last, as least, should be allowed some claim to Roman origin.

POSTSCRIPT

While this article was in manuscript, I chanced to see some old air-photographs of *Salona* (near Split, and 65 miles SE from Zara), perhaps the most important *colonia* on the Illyrian coast. It was at once evident that here was another system of centuriation and a particularly fine example, covering an area of coastal plain about equal to that at *Iader* and likewise divided into 200-*jugera centuriae* (710 m. sq.). A full account of this discovery will be published later.

[15] On fig. 1 between A (Zadarski Kanal) and B (Amika Point) can be seen, on the coast, a few noticeably straight roads and field-boundaries. They are not part of the original 200-*jugera* centuriation, appear composite in date, and are shown mainly in order to eliminate them.

Tiree Craggans

by G. A. Holleyman

THANKS to the cultural conservatism of the highland zones of Great Britain many strange survivals eluded extinction well into the latter part of the 19th century. Indeed a careful search in remote parts of the Scottish Highlands and Ireland (1) in the present day will reveal, principally among the older population, practices and beliefs that belong to medieval times or may have their roots in the paganism of even more remote antiquity. Whispers concerning magic, witchcraft, and the evil eye still circulate among our Erse- and Gaelic-speaking populations, though rarely can the English-speaking stranger ever overhear them. They are mysteries still vital in regions wild and isolated, yet at once deprecated as nonsense by their staunchest advocates in chance conversations with the enquiring Sassenach. These views are rapidly losing ground and the younger folk with their better education and closer contact with the outside world know little of them and care less, yet it will be another generation or two before the last of these beliefs is forgotten. Material survivals have disappeared more rapidly owing to improved means of transport and the introduction of manufactured goods. Even here surprises await the patient investigator. The writer, who spent twenty months on Tiree, the outermost island of the Inner Hebrides, was presented with a horn spoon by an old lady who had used it up to that very morning to eat her porridge, has seen the busy housewife plying her evening care at a spinning wheel made less than fifty years ago, watched butter being made in a vertical plunger churn, and has seen a primitive clay pot or 'craggan' still regarded as a household utensil of some value.

The craggan (also Croggan, Cragan and Bollachan) is perhaps the strangest material survival of all. These vessels first attracted the attention of the archaeological world in 1860 when Capt. F. W. L. Thomas presented nine specimens from the Barvas district of Lewis to the Society of Antiquaries of Scotland (2). The first illustrated account of them was published in 1880 by Arthur Mitchell (3) who had visited Barvas in 1863 in company with Capt. Thomas (figs. 1–4). At that date the practice was dying out, Barvas being the sole surviving centre of the industry in the island. It is now certain that in Tiree at least the art of craggan-making persisted sporadically for another generation and a few specimens may have been produced very early in the present century. This local survival was due to a strange belief (see below) which, to the writer's knowledge, is not recorded from any other island in the Hebrides.

No prehistoric culture known in Britain produced pottery cruder or more primitive than the Hebridean craggan ; in fact even the Neolithic and Bronze Ages produced, on the whole, vessels incomparably superior in design, texture and workmanship.

Craggan shapes do not vary greatly. Broadly speaking they may be divided into three groups, viz :

(a) Those with a neck and everted rim.
(b) Those with a shoulder and constricted neck but without an everted rim.
(c) Cup-shaped vessels with more or less parallel sides.

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[1] E. Estyn Evans, *Irish Heritage*, 1942.

[2] *Proc. Soc. Ant. Scot.*, 1860–2, iv, 72.

[3] Arthur Mitchell, *Past in the Present*, 1880, ii, 25–33.

Group A is the commonest (FIGS. 1, 3, 4 and 11). The general shape is globular, some almost spherical, with the neck aperture varying from a quarter to three-quarters of the maximum diameter of the vessel, and a short out-turned rim. Sometimes the rim edge is thin but in other examples it may be rolled over to give a crude bead effect. The base is generally rounded but tends to be flattish in the centre. It is interesting to note that craggans of Group A are almost identical in shape with Saxon cinerary urns. It is quite probable that many such vessels were intended to have fully everted rims but the skill of the potter failed, or the inferior quality of the clay may not have allowed of this more difficult refinement of shape. Group C comprises cup-shaped pots (FIGS. 7, 12, 14–16). These may vary between tumbler shapes, hemispherical or cup shapes, and shallow, almost saucer-like, vessels. The later Tiree craggans belong mainly to Group C. This classification of shapes is not in any way definitive as many modifications and variations undoubtedly occurred. Sometimes external influences prompted craggan-makers to forsake traditional shapes for imitations of imported wares. Mr Arthur Mitchell illustrates copies of Staffordshire ware and clay figures made by a Barvas woman to demonstrate her ceramic skill (FIGS. 8–10) (4). All craggans have rounded or semi-rounded bases ; they are shaped with the hands without aid from any sort of potter's wheel, and with rare exceptions are devoid of ornamentation. If decoration is used it is in the form of short incised lines made with a piece of wood, the thumb nail, or a pin (5). The clay is coarse, only the larger impurities being removed.

Sizes of craggans vary considerably. Latterly only smallish ones were made varying from three to five inches in height, but if one can believe accounts by some of the older members of the island community some vessels seen within living memory stood between twelve and twenty-four inches high (6). This is not improbable as some of the uses attributed to craggans demand a large capacity, and Mr R. B. K. Stevenson, keeper of the National Museum of Antiquities of Scotland, reports that a specimen in the Museum from Tiree is fourteen inches high. Martin records that in Tiree the ' brewers preserve their ale in large earthen vessels, and say they are better for this purpose than those of wood ; some of them contain twelve English gallons ' (7). At an occupation site at Balephuill dating within the last five hundred years the writer has found fragments of earthen pots which in size and capacity compare with those in Martin's description. It must be remembered too that only within the last one hundred years have metal pots or manufactured vessels of pottery and glass become common in the homes of these people ; craggans must therefore have served a large number of domestic purposes.

Their geographical distribution is restricted entirely to the Hebrides, no parallels coming from Ireland where a peasant culture closely akin to that of the Scottish Highlands exists (8). Craggans were probably made and used throughout the remoter districts of the mainland on the west coast of Scotland (9), but the only surviving specimens, to the writer's knowledge, all come from the islands. Recorded examples, including those

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[4] About 1880 some attempt was made to commercialize this pseudocraft. Rough specimens in the forms of teapots, egg cups, etc., were advertized and sold. The industry did not last long.

[5] A. Goodrich-Freer, *The Outer Isles*, 1902, XVIII, 425.

[6] One must always bear in mind the Highlander's tendency to exaggerate in order to impress the Sassenach.

[7] Martin Martin, *Description of the Western Islands of Scotland*, 1703, The Island of Tiree.

[8] E. Estyn Evans, *Irish Heritage*, 1942, II, 10.

[9] Arthur Mitchell, *Past in the Present*, 1880, II, 29.

Fig. 1

Fig. 2

Fig. 3

Fig. 4

LEWIS CRAGGANS (quarter size approx.)
Figs. 1, 3 and 4 from Barvas. Fig. 2 from Tolsta
Reproduced from Mitchell's *Past in the Present*

in the National Museum of Antiquities, Edinburgh, and the Glasgow Art Gallery, come from Lewis, Harris, North Uist, Skye, Tiree, Coll and Iona.

When making enquiries among the inhabitants of Balevullin, a township of eighteen crofts at the north-west end of Tiree, in the summer of 1942 the writer discovered a crofter named Hugh MacNeil whose mother had been craggan-maker for the township. This venerable lady had died twenty years earlier at the age of eighty, so was born about the year 1842. Her name before her marriage was Flora Mackinnon and she had inherited the craft from her mother. Each township had its potter who was always a woman, and she, it would appear, passed on the art to one of her daughters. It was recorded by Mr Erskine Beveridge writing of Tiree in 1903 (**10**) that ' the last local maker of small urn-like cups (Flora Brown of Sandaig) died as recently as the Spring of 1896 ' (PLATE I, no. 1). It is now apparent that she was survived by at least one other craggan-maker for another twenty-five years. Hugh said that his mother made occasional small craggans almost to the time of her death, not for sale but to oblige neighbouring crofters (PLATE I, no. 2) who needed them for administering milk to invalids or consumptives.

This strange belief appears to be found only in Tiree (**11**). Accounts vary slightly ; first the craggan was heated upon the fire and then the milk drawn into it from the cow ; this was then heated again and administered to the invalid. Some versions of the procedure leave out the preliminary heating of the vessel. Milk so treated was said to be ' bainne gun ghaoth ' which means ' milk without wind ', and was believed to possess specially curative properties, and to be particularly efficacious in cases of consumption (**12**). Any native of Tiree of middle age or beyond can remember seeing this remedy applied and many still firmly believe in its efficacy. Each household possessed at least one small craggan reserved for this purpose.

Hugh MacNeil as a boy had often watched his mother make small clay pots and had himself made them, perhaps in childish imitation, in his early years. He agreed to demonstrate the process. First he went to a particular spot in his croft close to a water filled ditch. Here he dug down to a depth of approximately two feet revealing a stratum of pale blue and grey clay. Carefully selecting a large lump, as free from stone and earth as possible, he carried it to his house where he critically divided it, gradually eliminating the less suitable portion. The selected clay was then pressed into a ball which was constantly revolved between the two hands and probed for impurities. When most of these were removed the clay was ready for conversion into a small craggan. Holding the ball in the palm of his left hand he introduced his right thumb into the centre of the mass and commenced to revolve the clay with his four right fingers using his thumb as a pivot. This was done with great care, the thumb and fingers feeling all the time for any stones or hard lumps which still remained ; as found these were eliminated. The palm of the left hand with the fingers crooked to form a cup-shaped hollow helped to shape the base. The process of revolving went on until the walls were considered thin enough. Sometimes the hands were changed and the left thumb carried on the operation of widening the interior and smoothing the inside walls and bottom. Now and again it was necessary to introduce the fingers in order to get greater pressure on the

[10] Erskine Beveridge, *Coll and Tiree, their Prehistoric Forts and Ecclesiastical Antiquities*, 1903, IX, 70.

[11] Bearing in mind the homogeneity of Hebridean culture the writer makes this statement with certain reserve. It may be found that this belief had a wider distribution than is at present recorded.

[12] Arthur Mitchell, *Past in the Present*, 1880, II, 28 ; Erskine Beveridge, *Coll and Tiree*, 1903, IX, 70.

base from the inside or it would have remained too thick. As the walls became thinner and the main shape was achieved it was frequently necessary to assist the smoothing process by the application of water or spittle. If a plain cuplike craggan was all that was required the vessel was now complete except for carefully wetting and smoothing the rim (PLATE II and PLATE I, nos. 4–6). If an everted rim, or Group A shape, was planned the most difficult stage lay ahead. The cup-shaped vessel was now placed on a table or board and the two hands cupped round the sides. Slowly and carefully the mouth was pressed inwards as the vessel was revolved. This naturally resulted in a thickening of the rim or folding (this latter was avoided if possible as any break in the continuity of the clay was difficult to join), so every now and again the pressing inwards process was stopped while the fingers worked deftly to thin the lip and gradually turn it upwards and outwards. Here again it became imperative at intervals to introduce the thumb and fingers to shape from the inside the rounded shoulder the vessel now possessed. In turn each of these three last movements was executed until the maker was satisfied the correct shape had been achieved (PLATE II, no. 3). The craggan was now complete except for drying, firing and annealing.

The drying took approximately twenty-four hours near to a fire in order to get rid of any excess of moisture, but large vessels would take two or three days. On Tiree the local peat supply ran out one hundred and twenty years ago, after which for seventy years peats were brought from the Island of Mull (13), since then only a coal fire could be used for firing. The fire was allowed to die down when the craggan was placed in the hot ashes which would have to contain sufficient heat to bake it hard. When this was done and while it was still hot the craggan was taken out and milk poured into it and over it. This annealing process was supposed to make the surface less porous and give it a slight temporary glaze.

It is interesting to compare the above account with the description given by Arthur Mitchell of a Barvas woman making a craggan in 1863 (14). ' The clay she used underwent no careful or special preparation. She chose the best she could get, and picked out of it the larger stones, leaving the sand and finer gravel it contained. With her hands alone she gave to the clay its desired shape. She had no aid from anything in the nature of a potter's wheel. In making the small craggans with small necks she used a stick with a curve on it to give form to the inside. All that her fingers could reach was done with them. Having shaped the craggan she let it stand for a day or two to dry, then took it to the fire in the centre of the floor of her hut, filled it with burning peats, and built burning peats all round it. When sufficiently baked, she withdrew it from the fire, emptied the ashes out, and poured slowly into it about a pint of milk in order to make it less porous. The craggan was then ready for sale '.

Hugh MacNeil told the writer that large craggans were made by the coil method (15). He had also used at one time a cup and saucer made by himself. This making of objects other than pots occurred only when craggan-making was almost dead to meet the demands of souvenir and curio hunters. These imitations of modern porcelain and culinary utensils merely emphasize the debased skill and sheer crudeness of the craggan-maker's artistry (FIGS. 8–10).

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[13] Hector MacDougall and Hector Cameron, *Coll and Tiree*, 76.

[14] Arthur Mitchell, *Past in the Present*, 1880, II, 26–8.

[15] Whether Hugh MacNeil meant the true ' coil ' method, or the more common ' ring ' method was not, unfortunately, ascertained at the time of the enquiry, or subsequently. It is more probable that the latter method was implied.

Craggans were used for most domestic purposes. Writing sometime in the 1860's Dr Alexander Buchanan of Tiree (**16**) says, ' One hundred and twenty years ago craggans were the only articles in common use in the island for culinary purposes ; large ones were used as pots for boiling, others were used to keep milk, and others as drinking pails. They were even used as churns '. The writer was told by Mistress MacNeil, an old lady in Balevullin, who possesses a craggan made by Hugh MacNeil's mother (PLATE I, no. 2), that she remembers seeing craggans used as milking pails, a leather strap being fitted round the neck and a handle attached. Craggans used as butter churns have been recorded. One specimen from the Island of Coll, and described by Mr Ludovic Mann (**17**), is now in the Glasgow Art Gallery. The use of large craggans as storage vessels for ale was common in Martin's day for he mentions the practice both in Lewis and Tiree. Writing of the former island he says, ' The soil is generally sandy, excepting the heaths, which in some places are black, and in others a fine red clay ; as appears from the many vessels made of it by their women ; some for boiling meat, and others for preserving their ale, for which they are much better than barrels of wood (**18**) '.

Craggan-making is now extinct. In the whole of Europe only in Denmark and possibly in White Russia does the craft of making non-wheel-turned pottery survive. The Jutland pottery and its manufacture as described by Axel Steensburg (**19**) appears to exhibit a far more advanced and complex technique than that shewn by the craggan-maker. The care and skill of the Jutish potter in almost every stage in the process from selecting the clay to the final firing and glazing of the vessels bear small comparison with the childlike simplicity of the craggan-maker's methods. Apart from the fact that both craggans and Danish hand-made vessels are non-wheel-turned almost the only points of resemblance lie in the use of milk for reducing porosity, and the tendency to rounded bottoms in both classes of vessels.

Pottery making in Jutland was and is a specialized industry, and such wares were produced for export as well as for home consumption. Craggans were made for home consumption only. It seems certain however that on Tiree their manufacture could be regarded as an industry, for specialization appears to have taken place. Hugh MacNeil's mother was the recognized potter in the township of Balevullin, and she had inherited the craft from her mother who held the position before her. Flora Brown had similar status in the township of Sandaig. Dr Mitchell hints vaguely at specialization in Lewis by stating that ' one of the women was pointed out to us as particularly skilful ', and that when the manufacture was complete the ' craggan was ready for use and sale (**20**) '. Dr Cecil Curwen received the impression in Lewis (**21**) that there at least the craft was originally one in which all women were more or less skilled, the craggans being produced at the domestic hearth as required. The economic status of the craggan-maker probably varied from one island to another. No evidence, either archaeological or historical, suggests that a special kiln was used for firing.

The history, origins and prototypes of craggans are subjects which cannot at present be dealt with at any length. Unfortunately no extensive study of Scottish Iron Age ceramic types has been made. It is in this period from *circa* 200 B.C. until possibly as

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[16] Arthur Mitchell, *Past in the Present*, 1880, II, 28.

[17] *Proc. Soc. Ant. Scotland*, 1907–8.

[18] Martin Martin, *Description of the Western Isles of Scotland*, 1703, The Isle of Lewis.

[19] ANTIQUITY, 1940, XIV, 148–53.

[20] Arthur Mitchell, *Past in the Present*, 1880, II, 26–8.

[21] E. C. Curwen, *The Hebrides : a Cultural Backwater*, ANTIQUITY, XII, 280–2.

late as A.D. 1000 that valuable analogous material could be found. This period is alternatively called the Dun Period as it was the era when the small round forts or duns so common in Scotland were occupied.[22] Mr A. J. H. Edwards, late Director of the National Museum of Antiquities of Scotland, Edinburgh, stated that many specimens of Early Iron Age ware in the museum evince characteristics comparable with those of the modern Hebridean craggans (22). Mr Erskine Beveridge who has made an extensive but peculiarly unscientific study of dun and prehistoric sites on Coll, Tiree and North Uist gives accounts, all lacking in precision and detail, of many vessels described as craggans or craggan-like, which he found in earth-houses, sand-hill sites, and among the ruins of duns. A typical extract relates to an earth-house discovered on Vallay Island, North Uist (23), in whch he found ' crushed fragments of a single craggan of large size and coarse material with a thickness varying from half-an-inch to an inch; also in another chamber was found a complete craggan set on its base and measuring twelve and a half inches in height with a width of twelve inches across its mouth. A vessel so fragile as to require utmost care in its removal '. Writing of his discoveries on the site of Dunan Nighean, Tiree (24), he says, ' Among the pottery were fragments of two very small cups, incomplete, though sufficient to show their shape and capacity . . . in both respects resembling the bowl of a modern wine glass '. In these and many other cases no details of shape, size, paste and firing are given, neither are they illustrated. Referring to modern craggans in his book on Tiree (25) he states, ' A few specimens of unglazed pottery (or craggans), closely resembling the Dun type, are yet to be found in globular shaped jars varying considerably in size '. It is evident from these extracts that Mr Erskine Beveridge was cognisant of many points of resemblance between modern craggans and certain Dun Period pottery. The writer has collected some hundreds of sherds of pottery from the well-known Tiree sand-hill sites of Balevullin, Kilmaluaig, and Balephuil, a large number of which, from their ornamentation, belong to the Dun Period. In the main the shapes conform to the craggan shapes described in this paper; it is significant that flat bases are extremely rare.

In conclusion, the evidence, incomplete as it is, suggests that the craggan is a modern though decadent survival of the pottery used in Western Scotland during the Early Iron Age. The evidence of occupation sites on Tiree (26) in which metal objects (chiefly bronze and copper) of 15th to 18th century date are found in conjunction with sherds of craggan-like ware also points to an unbroken succession of local pottery-making from the Early Iron Age through the second millennium A.D. to the 19th century. Such a survival could only be possible in a region of insular remoteness such as the Hebrides. When one considers that wheel-turned pottery was produced in southeast Britain in the 1st century B.C. the fact that this improved technique never reached the Hebrides, even in the 19th century, indicates, perhaps more forcefully than any other single fact, the stubborn resistance to new ideas shewn by the more isolated areas of our Highland Zone.

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[22] This view is also evinced by G. Graham Callendon when referring to certain sherds, in his report on the pottery found by Erskine Beveridge in the group of earth-houses at Foshigarry, North Uist. *Proc. Soc. Ant., Scotland*, 1930–1, LXV, 346.

[23] Erskine Beveridge, *North Uist*, 1911, V, 119.

[24] Erskine Beveridge, *Coll and Tiree*, 1903, X, 94.

[25] Erskine Beveridge, *Coll and Tiree*, IX, 70.

[26] Erskine Beveridge, *Coll and Tiree*, XI and XV, also *The Sandhill Sites of Balevullin, Kilmaluaig and Balephuil*, to be published by the author.

Notes and News

AN INTERESTING EFFECT OF DROUGHT ON BARREN LAND

Readers of ANTIQUITY will be familiar with the process by which a long spell of dry weather shows up the presence of wall foundations and other buried structural remains by the parching of grass over their site, or by the relative failure of crops there. A classic instance of this is the famous air-photograph of the Roman town of Venta Icenorum at Caistor St. Edmunds near Norwich, where the details of buried roads and buildings were shown with the clarity of a map, and formed an exact guide to subsequent excavations.

The present dry spell has shown up a novel variant of this process which deserves to be placed on record.

The ploughing of Mill Heath, Cavenham, near Bury St. Edmunds in the autumn of 1947 has revealed the presence of a large Anglo-Saxon urn cemetery of unusual importance. The excavation of this has been proceeding under the direction of Mr T. C. Lethbridge, F.S.A., and one of the most interesting features has been the close proximity to the cemetery of the sites of two small Roman structures which have been entirely destroyed, and their materials removed at a period which is likely to fall within Anglo-Saxon times, though whether this was the work of the pagans or of their Christian successors is not clear. One of the buildings, a small square affair with a surrounding outer wall which suggests a tomb or a small temple, has already been investigated, and here the remains consist of nothing more than vague robber trenches, a few Roman tiles, scattered human remains belonging to one individual, and scraps of Romano-British and Anglo-Saxon pottery. Within a few yards there are indications of another and larger square structure which has not yet been excavated. In winter the site is distinguished by more tile fragments and a large quantity of broken mortar. It should be made clear at this point that the heath on which these remains occur is extremely barren, and that a corn crop planted in 1947 has yielded a desperately poor result, the crop having failed to come up at all in many places. The crop standing on the site of the unexcavated Roman structure is a strong exception to this, and the form of the building has been marked out in bulk on the ground in the most decisive way, making air-photography quite unnecessary for its appreciation. Since the site has not yet been examined it is not possible to give an account of it, but there is no reason to doubt that it is of the same type as the other, and that it has also been robbed of its materials, nothing being left but useless and fragmentary mortar.

It may be suggested that, in view of the extremely barren character of the soil over the whole of the heath, these two Roman sites are the only part of the area which contains any free and available nitrogen, and so, in spite of the large amount of mortar rubbish present, they are shown up by an unusual variant of the process which normally reveals such sites in dry weather. The excavated Roman site carries a crop of nettles, unknown anywhere else on the heath. Conditions of this kind are unlikely to be of frequent occurrence, and are only revealed by the ploughing of virtually uncultivable land which contains ancient sites.

It may be mentioned that the famous Cavenham bronze crowns of Roman date were found on Mill Heath, though the exact find spot is not known, and the publication of the account of this new cemetery and of its relationship with Roman structures which may have had a sacred character may be awaited with interest. C. W. PHILLIPS.

ARCHAEOLOGY IN THE U.S.S.R.

Kratkie Soobshcheniya o Dokladakh i Polevykh Issledovaniyakh Instituta Istorii Material'noy Kul'tury (Short Communications on Reports and Field Investigations of the Institute for the History of Material Culture) Acad. of Sc. of U.S.S.R. x (1941), pp. 144, ff. 46; xi (1945), pp. 154, ff. 57; xii (1946), pp. 182, ff. 68. Moscow-Leningrad.

These three parts contain most of the recent results of Archaeology in the U.S.S.R. accounts of which have reached us. (*Sovetskaya Arkheologiya* vii, *Bull. de l'Histoire Ancienne*, 1940, 3/4, *Matériaux et Recherches d'Archéologie de l' U.S.S.R.*, 1, 2, 4, 5, the latest numbers I have seen do not include anything later than 1939; see my general account of these publications in *Ant. J.* xxv (1945), 198). *Short Com.* x to xii come down to about the time of Hitler's attack in June 1941. It is difficult to summarize short communications, but I have done my best, sorting them so as to bring similar matter together.

It is remarkable how much archaeological work went on during the war (xii, 153–161) though the results are not yet accessible to us; this although many archaeologists fought or did war-work; five of the authors in xii gave their lives. Archaeologists were formed into groups, one was evacuated from Leningrad to Tashkent, another to Yelabuga on the Kama, a few remained in Leningrad, these with the Moscow Section were much engaged in taking precautions against damage, registering it and beginning the work of restoration. Three or four old scholars, the last whom I knew personally in Leningrad, succumbed to the hardships of the siege. Since the repulse of the Germans restoration work has been going on feverishly.

A very full account of 'Anthropology in the Soviet Union, 1945' by Dr Henry Field is in *American Anthropologist*, 48.3 (July-Sep. 1946) 375–396. It deals with organizations and persons, including Archaeology under Anthropology.

Palaeolithic. (Much Palaeolithic and Neolithic is reported in *Mat. et Rech.* 2, 1941). A. P. Okladnikov (x, 16–34) describes Buret' station on the 15 m. terrace of the R. Angara about 50 km. above Mal'ta. N. V. Tyumentsev (31–40) dates it at the end of the Ice Age or soon after. The settlement is rather like Mal'ta, similar statuette, similar fauna. Most remarkable are four houses along the old river bank, large, 25 m^2, permanent structures sunk in the ground but rising above it on foundations fenced with low walls of stone slabs on edge, big bones and rhinoceros skulls, roofed with bone and antler. No. 2 was best, plan, 23, f.10, reconstruction 29 f.11. Very similar to Chukchi and Eskimo houses of whales' bones, but this is due not to kinship but to similar circumstances.

G. Debets (xi, 153) reviews Bonch-Osmolovski on Crimean Palaeolithic, especially a hand from Kiik-koba, probably Neandertal, less power of opposing thumb than either *homo sapiens* or anthropoids. Okladnikov reports (xii, 7–9) first find of Palaeolithic on the river Lena, upper course, late like Afontova Gora, at Ponomarëva.

M. V. Talitski reports first Palaeolithic in the Kama area, at Peshcherny Log just above the confluence of the river Chusovaya with the Kama.

Epipalaeolithic, Swiderian, near Trubchevsk on rivers Desna and Nerusa, (x, 95) passing into

Neolithic. A. Ya. Brusov (x, 99–108) in the Vologda region on the river Modlona found early Neolithic (III mil. B.C.), later ochre graves, and then an interesting pile settlement at Pogostishche with amber ornaments from the Baltic. The houses were roofed with pine and birch bark held in place by stones, and were joined by duck-boards : date just before 200 B.C.

Chalcolithic. T. S. Passek gives shortly with good illustrations (XII, 14–22) what her *Tripilska Kultura* gave at length, see summary by V. G. Childe, ANTIQUITY, 1945, 203–206.

Bronze Age statuettes of bearded men were found at Archo and elsewhere in mountain Daghestan on actual cult-sites at the top of hills. As many such statuettes were made at Tiflis about 30 years ago, and spread as far as Poland, it is interesting to find that some are genuine.

Scythic remains are hardly touched on. Degen (XI, 142–145) reviews unkindly *Arch. Exped. of Hermitage* I. A. A. Iessen and B. B. Piotrovski ' Mozdok Cemetery ', an interesting mixture of Caucasian and Scythic. A real novelty offered is by P. N. Schultz (XII, 44–57) on Greek style sculptured portraits from Kermenchik (Neapolis ?) near Simferopol, which he identifies as Scilurus and Palacus, kings there in late II B.C.

Anan'ino not much either, A. V. Zbrueva (X, 108–111), excavating Lugovskoe on lower river Kama found among other things a fine Scythic-type iron dagger. P. A. Dmitrov (XII, 22–26) reports a promontory settlement like Gorbunovo on Isset lake, 14 m. N.W. of Sverdlovsk (Ekaterinenburg). To the Permian region belong various things in the Cherdyn' and Molotov (Perm') Museums observed by N. A. Prokoshev particularly the Anikova find (cf. K. V. Trever, *New Sasanian Dishes in the Hermitage*, M–L, 1937) and a new bowl (Indian) ? from Il'inskoe (XII, 89, f. 44) rather like *Oxus Treasure*, 205. (*Mat. et Rech.* I, is all devoted to this region).

Classical Sites. Chersonese, Byzantine, potters' kilns (X, 53–62) ; houses on northern shore (XII, 57–63). (More from Chersonese and from Bosporus neighbourhood in *Mat. et Rech.* 4, 1941). For Olbia, since 1915, see my notice in *J.H.S.*, 1946. It is interesting that both at Chersonese and Olbia contracted and red skeletons have been found indicating the survival of a primitive native element (XII, 26–30).

V. D. Blavatski treats of a Scopaic head in the Yalta Museum, but it may have been brought from Greece (XII, 63–72).

The spread of the *Slavs* is much discussed nowadays : the idea of a Slav home in south Poland is rather out of fashion in the U.S.S.R. : e.g. P. N. Tret'yakov seems to think that they developed farther east and early reached the upper Volga and Oka (*Mat. et Rech*, 5) and that the Antes dwelt on the mid Dnieper (X, 120–124) I. I. Lyapushkin (XII, 117–127) describing Oposhnya, 25 km. north of Poltava, thinks it the southeast limit of the Slavs' expansion in A.D. VIII–X. The trouble is that the Slavs left hardly any recognizable traces of their own between A.D. VII and IX.

Russian towns, explored recently, have furnished the most striking novelties published in these three parts of *Short Com.* e.g. *Gnesdovo* (XI, 26–28) VIII–X C. forerunner of Smolensk : it yielded a new Byzantine coin of Alexander (912–913) mounted as a pendant.

Old Ladoga, perhaps the first town seized by the Varyags, the cemetery shows a clear contrast between Slav graves and Scandinavian boat-graves, is dealt with by the great authority V. N. Ravdonikas (XI, 30–41). The houses are comparable to those at Stellenburg on the Eider. Most interesting is a study of its weeds, berries and grains including millet, never found so far north before. In an enumeration of what Norse sources say about it, there comes out that it was the regular place where people changed from river boats to sea craft.

At *Kiev* digging has gone on for thirty years at the Desyatinnaya church built by Vladimir : now we have a tragic monument to its destruction by the Tartars in 1240, a hiding place under its floor in which people were trapped (x, 75–83) : it contained goldsmith's tools and stock-in-trade and many skeletons. Another workshop was in a XI c. house (XI, 5–15) where amber and silver were wrought. Near Kiev is Vshchizha where (XI, 15–19) V. A. Rybakov describes a quern (XII–XIII) rather like that from North Uist (ANTIQUITY, 1937, 149 f.39). At Kiev he found an amphora (XII, 134–137) with the pleasant inscription ' Most blessed is this *korchaga* when full '. Now we know what was called a *korchaga* in the XI century.

The special architecture of *Smolensk* from XII century on is discussed (XI, 19–26). Considerable Romanesque influence is noted. Excavations have long been going on at *Novgorod*, this time (XI, 65–72) in the Kreml or *arx* : e.g. the foundations of the *Sobor* of SS. Boris and Gleb built in 1167 by Sadko the famous merchant, and ruined in the XVII century. Settlements in the country dominions of Novgorod were also examined (73–81) without any surprising results. Novgorod has suffered terribly by the German barbarity : perhaps no destruction has so much grieved the Russians.

On *Bogolyubovo* very important work was done (XI, 78–88) : this famous settlement near Suzdal was built in 1158 to 1165 by Prince Andrew who thence took his name. The *Sobor* of the Nativity of Our Lady, which like all in this region shows strong Romanesque influence (see D. R. Buxton, *Russian Mediaeval Architecture*, p. 24–26) has been largely rebuilt, but Andrew's approach to the galleries survives and give N. N. Voronin a chance to offer a restoration of the whole complex, the only secular building surviving from XII century Russia. V. V. Ginsburg follows with a full technical description of Andrew's skull, and M. M. Gerasimov has exercised his peculiar skill in restoring his outward appearance (f. 37). In 1935 it was pointed out that the lesions in his skeleton answer very well to the chronicle's account of his murder. This study of Andrew is a pendant to their study of Yaroslav (d. 1054) and his wives (VII, 46–80).

At *Suzdal'*, the capital of that region, town houses of the IX to XIV centuries were explored, as so often in Russia they were mostly *zemlyanki* half underground (XI, 91–96) ; also A. D. Varganov re-examines the *Sobor* of the Nativity and E. S. Medvedeva proposes a more precise date, 1230–1233, for the wonderful doors of copper inlaid with gold, while F. Ya. Mishunov explains their technique. (For churches in this region see I. I. Tolstoy and N. P. Kondakov, *Russian Antiquities*, VI St. P., 1899, 12–82).

E. and V. Holubowicz (XI, 114–137) determine the original site of the *Vilna* citadel and describe barrows (IX–XIV centuries) in the *Vileyki* district in Belorussia.

Ch. Peets (X, 40–46) gives a rather naïve account of *Tallinn*, not to compare with literature accessible in German, but L. A. Matsulevich follows (47–53) pointing out interesting resemblances between the gables of its houses and those of Novgorod churches.

H. Moora, the best authority, summarizes the progress of *Estonian* archaeology for the last 20 years, calling special attention to the well produced *Les Forteresses de l'Estonie*, which he sent me in 1939. L. A. Dintzes ' Study of Russian Popular Art in the Tradition of N. Ya. XII 141–152, is Marr ', as unconvincing as its title suggests.

In *Central Asia* S. P. Tolstov (XII, 90–93) describes part of what he summarized for us in ANTIQUITY, 1946, 92, about remains in *Khwarizm* (Khiva). Further east V. A. Shishkin gives an account of ' the Site of *Warakhsha* and its surroundings ', mounds 25 km. northwest of Bukhara. The western mounds, Kyzyl Tepe, go back to the Kushan period A.D. IV–VII ; most of Warakhsha is of the time of the Bukhar Khudats from Sasanians to the Arab conquest. It yielded Sogdian coins and inscriptions, frescoes

(well illustrated) like Miran and Kuh-i-khwaja, stucco decoration different from Sasanian; all was suddenly deserted about XI century. This contraction of the irrigated area, or perhaps its shifting, is noted in all Central Asia from the Tarim basin to the Aral sea.

G. V. Grigoriev (XII, 94–103) discusses artistic handicraft in pre-musulman Sogd with Greek and Indian influences, cf. his article 'Tali Barzu' (south of Samarqand) in *Travaux du Dép. Oriental de l'Ermitage,* II, 87–104. Gryaznov (XI, 145–149) rather unkindly reviews A. N. Bernshtam, 'The *Kenkol* Cemetery' published in *Arch. Exped. of the Hermitage,* II, 1940: but Bernshtam's other works on north Kirgizia and the Talas Valley are very good, and this cemetery on the upper Talas southeast of Aulie-ata is interesting as shewing a mixture of Chinese and Hunnish remains. Another example of Huns and Chinese together is described by L. A. Evtyukhova (XII, 72–84), a complete Chinese house in the Han style found at the confluence of the river Abakan with the Yenisey. The hypocaust reminds me of Roman Britain. The author suggests that it was built for Li Ling (W. F. Mayers, *Chinese Readers' Manual*, No. 357) who defeated by the Huns in 99 B.C., came over to their side to escape the death that awaited him on his return, but several other Chinese generals did the same thing. As their families were executed they could freely start another life among the Huns.

Perhaps I ought to mention articles on an early Samanid *fels* (coin) AH.265/879 and an Arabic seal of Ashot I of Armenia A.D. 922–928 (XII, 103–117).

Quite unlike any of these articles is E. V. Zhirov's attack (X, 63–75) on our faith in brachycephaly as a racial characteristic. He declares that e.g. von Luschan's Armenoids in nearer Asia are due to the special cradle (*bešik*) used in those parts, into which the child is immovably bound during the first year of its life. I am assured that this has all been refuted, but it seems to me plausible.

Part XII ends up with a report on the IVth Conference of the Archaeological Institute of the Academy of Science of the Ukraina, held at Kiev in 1941. (Much material from Ukraina Museums was carried off by the Germans to near Augsburg whither it was followed by several Ukrainian archaeologists. The material has probably been sent back, but the fate of the persons is unknown. The Ukrainian Universities were evacuated to Kzyl-Orda (Petrovsk) on the river Syr Darya).

Next followed the first part of the letter addressed by Russian Archaeologists to their English Colleagues (*Soviet War News*, 7 August 1942), and, to my great surprise, one of my letters in answer, that addressed to Professor Tatiana S. Passek, Secretary of the Institute, but her name as addressee is not given. ELLIS H. MINNS.

Reviews

UN PEUPLE CAVALIER PRESCYTHIQUE EN HONGRIE (Dissertationes Pannonicae ex Instituto numismatico et archaeologico Universitatis Budapestinensis provenientes, ser. II, 9, 1939). *By* SANDOR GALLUS *and* TIBOR HORVÁTH.

At least the title of this monograph is refreshing; for it reminds archaeologists that many objects that they study from a formal point of view are not merely convenient fossils for defining cultures and periods, but also symbols of great social upheavals. Such was the rise of cavalry to compete with and eventually replace the older chariotry. Unfortunately the authors hardly justify their title. If they prove that horses were harnessed for use in war on the great Middle Danube plain before the intrusion of the Scyths, they do not even try to prove that they were ridden.

The book is essentially devoted to a typological study of bronze bits and associated horse-trappings found principally in the area of the ancient Hungary and of their eastern analogies. The authors are handicapped by the fact that so many of the objects examined come from hoards or graves so badly excavated or published that crucial details like the homogeneity of the find, its total composition and even the number of bits in the group can no longer be established. Most Early Iron Age bits—the certain Bronze Age bits from Syria and Palestine were rather differently constructed—used metal cheek-pieces that themselves derive from antler cheek-pieces such as are so common in Late Bronze Age settlements all over temperate Europe from the Po valley to Scania and from Wallachia to County Durham, and occur equally in Transcaucasia. Some pairs of bronze cheek-pieces from Georgia and Bavaria are slavish copies of the antler model and so are some depicted on Assyrian bas-reliefs if these represent metal bits at all.

The East European series here studied preserve something of the curved outline of the antler cheek-pieces and the triple perforation—two slots for the straps connecting with the head band and between them one for the mouth-piece. But the perforated section has (save in type II b) been straightened out and the whole ends in knobs. In the bits regarded as earliest by Gallus—types I–II—the perforations are expanded into tubes projecting from each side of the rod while in his type III they are reduced to slots in the metal. Bits in which the perforations are replaced by projecting loops are considered to be still later. The difference between types I and II depends chiefly on the shape of the terminal knobs—large and mushroom-like in I, smaller and more globular in II, but a variant of type II is bent at an angle round the central tube. The paucity of closed finds makes it difficult to establish either the relative or absolute chronology of the several types.

Type I is represented in grave 3 at Füzesabony. But, as Gallus is at pains to insist, the funerary pottery from the cemetery is different from that of the 'Late Bronze Age' settlement; the fluted urns are Villanovan in shape and further north and west would be termed Hallstattian. The pottery from the large urnfields of Dalya and Kisköszeg, where type I bits occur without specific associations, is similar in a general way. Bits of the same type from Zabori in Bohemia and Karmine, Silesia, are attributed to Hallstatt B in Reinecke's system, but the most reliable association for type II is a sabre from a cremation grave at Balta Verde, just below the Iron Gates which would normally be classed as Hallstatt D. But a bit of type II b occurs in the classical lake-village of

Alpenquai, Zürich, that is supposed to have been deserted at the end of Hallstatt B. As bits of type III are associated with long iron swords, for instance in the Platenice culture of Bohemia, this type too should go back to Hallstatt C, but the bits from the contemporary Bylany graves approximate to II. So we are left in some doubt whether any of Gallus' types really antedate this the first phase of the true Hallstatt cultures. Nestor frankly assigns the whole series to Hallstatt C–D and he is probably right.

At the same time the uncertainty at present reigning as to the absolute chronology of the First Iron Age in Europe leaves ambiguous the striking analogies noted by Horváth between the Hungarian bits and horse-trappings and those from the Caucasus region, western Iran and even the steppes round Minussinsk. On the ' long ' chronologies endorsed by Reinecke and more recently defended by von Merhart the Asiatic harness fittings could well be derived from Central Europe ; Åberg's ' short ' chronology, still further abbreviated by Hencken, would allow only the reverse. The English middle way—' Hallstatt C begins about 750 B.C. '—might demand as explanation of the observed facts parallel translations of antler and perishable material in Central Europe and Hither Asia. On the whole, Gallus and Horváth have merely established the existence on the Middle and Lower Danube of groups of horse-using people contemporary with the well-known Hallstatt knights west and north of that river.

But they have not even tried to show that these people rode their horses. The mere occurrence of bits in a grave does not prove that the deceased rode or fought on horse-back. Indeed the chances are, in the light of Oriental, Mycenaean, Etruscan and La Tène analogies, that chieftains buried with horse-gear were charioteers. Such would of course need two bits and therefore four cheek-pieces. It is only the deposition of a single bit (one mouth-piece and a single pair of cheek-pieces) that would establish a *prima facie* case for equitation. Gallus entirely misses this point and so, in default of other evidence—winged chapes* or representations such as occur on the Hallstatt urns from Ödenburg—fails to justify the first adjective in his title. In reality evidence of this kind for riding is to be extracted from some of the grave-groups Gallus describes—Balta Verde, Nagyenyed, Doba, Füzesabony, though he omits to mention it explicitly.

But of course a pair of bits, though implying draft-horses, does not necessarily point to chariotry instead of cavalry. Rich princes of Hallstatt D including the Jogassians on the Marne, at least were frequently buried with the hearse that had carried them to the grave and all their fittings including bits, but not the steeds. In some cases a third bit may represent the deceased's warhorse, but in the Bylany graves this third bit was not fitted with cheek-pieces. Quite a number of burials furnished with remains of vehicles or horse-trappings have long been known from France and southwestern Germany. Most were dug up last century, and the excavations were so badly conducted and the publications so inadequate that it is extraordinarily difficult to make out how many wheels or how many bits were deposited in the grave and so to determine even the significance in military history of these rich barrows. Paret in his publication of his own meticulous excavation of one such barrow (' Das Fürstengrab der Hallstattzeit von Bad-Cannstatt ' Anhang to *Fundberichte aus Schwäben*, VIII, 1935) gave a survey of earlier discoveries of *Wagengräber* that serves to show how much evidence has been destroyed. It is a relief to turn to a recent Czech book that also indicates what superb work our Czech colleagues have been doing behind the iron curtain of Slavonic speech.

In ' Knížecí Pohřby na Vozech ze starší Doby železné ' (*Praehistorica* I, Praha, 1938) Dr Fr. Dvořák describes in Czech with a very full German résumé the royal

* I know no Hallstatt long swords from Hungary south of the Bakony.

tombs of the Bylany culture round Kolin. While the Platenice urnfields occupy eastern Bohemia, the richer centre of the land is taken up by the Bylany cemeteries. These comprise relatively poor cremations in urns, large graves containing half-burned skeletons either alone or with an inhumation, and spacious shaft-graves under barrows containing skeletons, normally extended but occasionally contracted. All the latter graves are richly furnished and often contain joints of pork. A few among them are genuine royal tombs and contain hearses. Dr Dvořák describes in detail five such graves that he himself excavated as well as a dozen or so similar tombs observed earlier and less accurately. Thanks to careful digging and precise observation the author has been able to recover many details in the construction of these four-wheeled hearses and, what is most surprising, the yokes to which the horses were attached. The wheels with 6 to 8 spokes measured 80 to 82 cm. in diameter while the tyres were studded with iron nails and slightly wider than the felloes, the naves of wood plated with iron. The yokes of oak wood partly cased in leather were richly decorated with a mosaic of bronze nails and were carved at both ends. One at least was regarded as so valuable that it had been wrapped in linen and encased in a wooden box before burial.

Now in at least three graves three bits were found of which two in each case belong to Gallus' type II. The yokes are actually long enough to allow of three horses abreast but it seems more likely that the third bit, which is usually found some distance from the other two and is often of rather different pattern, stood for the war-horse that would doubtless be led to the grave in the funeral procession. He is of course thus represented on Hallstatt urns and on an ivory sheath as well as in Greek and Etruscan funerary scenes.

The grave-goods include further many vases graphited or painted in colours, long iron Hallstatt swords, a lug axe, and those curious clay crescents generally termed ' Moon Symbols ', but hardly ever a fibula. Apart from this negative trait, the ritual and furniture with which these Bohemian kinglets were buried agrees very closely with those long familiar from the plundered Chieftains' Graves of southwest Germany, Switzerland and eastern France. From this agreement Dvořák and Filip draw the conclusion that the Hallstatt rulers of Central Bohemia were already Kelts though their subjects included members of an Urnfield population. The justice of their conclusions is confirmed by reference to the rôle of pork in the funerary feast; in view of the prominence of swine among the historical Kelts including the Parisii of Yorkshire. (That is of course not a trait peculiar to Kelts—joints of pork are reported for instance from cremation graves of the Bordei-Herăstrău culture in Roumania which is just pre-La Tène and presumably Thracian or Agathyrsian). V.G.C.

EARLY INDIAN PAINTED POTTERY. *By* D. H. Gordon. *Journ. Indian Soc. Oriental Art*, XIII (1945), 35.

In this study Col. Gordon draws attention to the danger of thinking in terms of a ' Painted Pottery Period ' in Indian prehistory, since the technique of pottery painting has lasted little changed in North-West India until the present day. Such an idea has long been exploded in Europe, and would hardly be held by reputable Oriental scholars even in India, but the warning may be valuable to the amateur. Gordon refers to the late Brig. Ross's invaluable work at Rana Ghundai (now published in *Journ. Near Eastern Studies* V (1946), 284–316), but seems to under-rate the Buff Ware and Red Ware grouping of Iranian prehistoric wares and their Indian counterparts—a broad distinction which we own to McCown and seems to the reviewer not only the only reasonable basis for classification, but one which really does make sense in the light of

increasing knowledge from India. The comparisons between Hissar I and Rana Ghundai II have been considerably strengthened by the new material published by Ross, and the ' archaistic ' wares of Bampur and Khurab cited by Gordon in this connexion are not really relevant, their affinities being with those of Shahi-tump, a site which can hardly be early than Akkadian. For the Nineveh V—Tell Billah chalices with animal friezes quoted by Gordon, McCown's remarks should be noted (*Comparative Stratigraphy of Early Iran* (1942), p. 48, note 88).

The survival of painted pottery traditions in Western India is a matter of great interest: at Ahichchhatra the fine black-on-grey painted wares seem likely to be IV century B.C., and Sassanian textile patterns were copied in the VI–VII centuries A.D. by pot-painters in the Quetta region, which gives an approximate dating-point in an otherwise rather vaguely ' post-prehistoric ' series. But after all, in Sind, as the late Ernest Mackay pointed out, pottery painted with good Harappa Culture designs was being made a few years ago, so we may have to be more than usually chary about making chronological equations in a country so conservative as India. STUART PIGGOTT.

EXCAVATIONS IN THE CUENCA REGION, ECUADOR. *By* WENDELL C. BENNETT. *pp.* 84, 17 *figs.*

The Cuenca Region in the southern Andes of Ecuador has been known chiefly for the large hoards of indigenous pre-Colombian gold and copper work which have been found there. Remains of the subsequent Inca occupation, notably the town of Tomebamba on the site of Cuenca itself, have also long been known. Recently a scientific excavation (1) in the Cañar Basin at the northern end of the area has established the existence of a culture, called the Cerro Narrío, stable for a long period before the Inca conquest, whose outstanding characteristic is red-on-buff pottery, some of it of fine quality. Most of the metalwork undoubtedly belongs to this culture, which is ascribed to the historic Cañaris.

Dr Bennett has surveyed several groups of sites, near Cuenca and to the south of it, and has excavated some of them, finding in most cases quite a thin deposit, yielding little except sherds. As a result he has shown that the distribution of the Cerro Narrío culture extends southwards at least to a short distance north of Cuenca, and that it can be divided into stages, one of which is probably earlier than anything found at the type site. He has also found a later thick ware style of uncertain age, which extends well to the south of Cuenca. A summary of Ecuadorian archaeology, which is given at the end, is designed only to put the excavations in their proper perspective and not to supersede Collier's recent work in the new Handbook of South American Indians (2). It contains some useful suggestions, but the absence of any specific relationships between Andean and coastal cultures (in spite of some statements to the contrary which have appeared) renders the sections dealing with the coast somewhat irrelevant.

BRITISH GUIANA ARCHAEOLOGY TO 1945. *By* CORNELIUS OSGOOD. *pp.* 65, 13 *figs.*

Little is known about the archaeology of British Guiana beyond some few coastal sites and a number of petroglyphs occurring inland along the rivers, the latter being, as usual, an unsatisfactory source of information owing to the impossibility of determining

[1] *Survey and Excavations in Southern Ecuador*, by D. Collier and J. V. Murra. Field Museum, Anthropological Ser., XXXV, 1943.

[2] *Handbook of South American Indians*, II. Bureau of American Ethnology, Bulletin 143, 1946.

their age. No one is better qualified to remedy this state of affairs than Dr Osgood, who paid a brief visit to the Colony in 1944, and although most of his specimens were destroyed in the Georgetown fire he was able by reconnaissance and trial excavation to make some contribution to our knowledge of the coastal region. His work comprises a geographical and historical account of the Colony, a summary of previous work and finally a description of his own work, with suggestions as to where excavations can most usefully be made to test his conclusions.

He gives ample reasons for discounting Im Thurn's ascription of the Pomeroon shell mounds to the Carib, assigning them instead to a lowly tribe, the Warrau, who made little pottery. By far his most important discovery, however, was that of the existence in the North-West District of his distinctive Venezuelan Los Barrancos type of pottery, which also occurs in Trinidad and is probably Arawak. In Demerara County he found a distinct but related pottery style, also ascribed to the Arawak, which looks in his figures very like some material from Kumaka in the Northwest District, whose temporal relationship to the Los Barrancos is uncertain.

This is only a beginning and it is to be hoped that it will not be too long before an expedition, equipped to overcome the very considerable transport difficulties, sets out to amplify Dr Osgood's explorations and perhaps to do something towards filling the blank which covers the interior of the country. G. H. S. BUSHNELL.

[The two reviews above are Nos. 35 and 36 of the Yale University Pubns. in Anthropology. *Yale University Press* (*London*, Geoffrey Cumberlege, O.U.P., 11*s* 6*d*)]

THE PILGRIMAGE OF ARNOLD VON HARFF, knight, from Cologne, through Italy, Syria, Egypt, Arabia, Ethiopia, Nubia, Palestine, Turkey, France and Spain, which he accomplished in the years 1496 to 1499; translated from the German and edited with notes and an introduction *by* MALCOLM LETTS, F.S.A. *London* : *printed for the Hakluyt Society* [*2nd series*, *no.* 94], 1946. *Bernard Quaritch*, £2 5*s* 0*d*.

The Hakluyt Society has, during its long and useful life, printed some 100 volumes or more of travels and translations. By so doing it has earned the gratitude of all students, for otherwise the documents thus printed or reprinted would have been inaccessible to most of them. Moreover, many such travel-books provide not only good reading in themselves but also the raw materials for the future historians of now primitive countries. What Pytheas is to us now in Britain, these early voyagers will one day be to the people of Africa.

Arnold von Harff came from a noble family of the Cologne region, and started his travels at the age of 25. Some of them were imaginary; he certainly never reached the Mountains of the Moon where the sources of the Nile were, and his Gamma and Kobalhar appear to be the twin offspring of the Gebel el Kamar of the Arabian geographers. The Mountains of the Moon were obviously the Abyssinian mountains of Simen and north of Lake Tana; here rises the Takkaze, very often confused with and called the Nile. The Mountains of the Moon were snow-covered, and so sometimes are the mountains of Simen. The knowledge of them is as old as the 4th century A.D., and they are mentioned in Ezana's Adulis inscription, copied by Cosmas Indicopleustes in the 6th century (Samene . . . en chionodesi oresin oikountes). Von Harff's places on the Nile are all taken, it seems, from maps including those of Ptolemy. But he seems also to have used (directly or indirectly) some other classical sources; 'Catadubba',

for instance, which puzzles the editor, is plainly Pliny's Catadupi who lived near and just above the 1st cataract. Mention is made of a certain king Thodar who ruled over ' Ethiopians called Abyssinians or Jacobites ', kept his court in the ' town of Nubia ', and received tribute from the Sultan that he (Thodar) might not cut off at their source the waters of the Nile—an old story. His subjects made pilgrimages to Jerusalem. There is here much obvious confusion between the kingdom of Nubia (then no longer Christian) and Abyssinia ; some of the early maps mark Nubia as a town. For the troubled events at Cairo, in which he was himself somewhat involved, von Harff is a first-hand contemporary witness.

The task of the translator must have been most laborious and difficult and few will be able to test the accuracy of his translation. We hope that the Society will continue to publish these useful volumes ; there are still many travellers' diaries whose publication would be welcome, e.g. that of Linant de Bellefonds at Oxford. The price seems very high ; does the Society really gain anything by delegating the publication to a bookseller ? O.G.S.C.

THE STORY OF WATER SUPPLY. *By* F. W. Robins. *Frontispiece, 26 plates, 5 text figures + 207 pages. Oxford University Press, 1946.*

This book contains a considerable amount of interesting information on the history of water supply, a subject on which popular literature is scanty and scientific and technical details have to be searched for through a wide range of general and specialized archaeological journals. Unfortunately the book does not fill the gaps but tends to fall through them. The author states that he has aimed at a work of ' general interest without great technical detail ' ; but in the first four chapters he has collected such a number of similar instances that the effect is exhausting rather than exhaustive ; in the later chapters the general reader might find much to enjoy and might have his attention drawn to a new source of interest and observation in his travels ; but he is likely to reject the book as tedious before reaching them.

Some of the plates, many of which show two photographs, are good and attractive : such things as the Monks' Conduit at Sherborne, the Oxford City Conduit now in Nuneham Park, the old leat at Tiverton or Drake's Leat at Plymouth deserve to be better known than they are, and a popular account is welcome. But here again it is unfortunate that the photograph on Plate 1 entitled, ' Dewpond below Cissbury Ring, Sussex ' is useless and unworthy of reproduction—many reviewers and possible purchasers will look no further.

The references throughout are badly chosen ; they include *The Daily Mirror* and *Lilliput*, but in the long account of the Aqueducts of Rome the standard work of T. Ashby, the attractive edition of ' Frontinus ' by Herschell with commentary and many illustrations and the convenient one in the Loeb Classical Library are omitted. Several inaccurate references have been noticed.

Perhaps the most remarkable feature of this unsatisfactory book is that it is published by the Oxford Press. C.N.B.

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